

Management Plan

Doris Leeper Spruce Creek Preserve

PREPARED FOR:
COUNTY OF VOLUSIA
COMMUNITY SERVICES DEPARTMENT
PARKS, RECREATION AND CULTURE DIVISION
GROWTH & RESOURCE MANAGEMENT DEPARTMENT
ENVIRONMENTAL MANAGEMENT DIVISION

Prepared By:
ZEV COHEN & ASSOCIATES, INC.
ENVIRONMENTAL SERVICES DEPARTMENT

Draft: October 2010
Revised: September 2011



DEP Approved Letter Inserted Here

LAND MANAGEMENT PLAN EXECUTIVE SUMMARY

Lead Agency: Volusia County

Common Name of Property: Doris Leeper Spruce Creek Preserve (DLSCP)

Location: Volusia County, Florida

Acreage Total: 1932.20 acres

Acreage Breakdown:

Land Cover Classification	Acres	% Area
Blackwater Stream	21.89	1.1
Bottomland Forest	65.46	3.4
Clearing	3.44	0.2
Coastal Hydric Hammock	7.48	0.4
Developed	9.76	0.5
Improved Pasture	4.85	0.3
Impoundment	5.01	0.3
Mangrove Swamp	15.19	0.8
Maritime Hammock	162.79	8.4
Mesic Flatwoods	281.59	14.6
Mesic Hammock	185.70	9.6
Salt Marsh	480.94	24.9
Scrub	280.04	14.5
Scrubby Flatwoods	254.13	13.2
Successional Hardwood Forest	27.50	1.4
Wet Flatwoods	112.83	5.8
Wet Prairie	13.61	0.7
Total	1,932.20	100.0

Lease/Management Agreement No.: 4195

(Appendix A)

Use: Single _____
Multiple X _____

Management Responsibilities:

Agency: _____
Volusia County
Responsibilities
Resource restoration, management and protection,
law enforcement, user group management

Designated Land Use: Conservation

Sublease (s): None

Encumbrances: None

Type Acquisition: Conservation and Recreation Lands (CARL) Program and Florida Forever Program.

Unique Features: Natural: Contains multiple imperiled habitats and large acreages of imperiled habitats, bluffs, scrub, salt marsh.

Archaeological/Historical: Over 15 documented archaeological/historical sites including two on the National Register of Historic Places.

Management Needs: Habitat restoration and improvement; user group management; hydrological preservation; exotic and invasive species maintenance and control; endangered and imperiled species habitat maintenance, enhancement, and restoration.

Acquisition Needs/Acreage: 2,831 acres in optimal boundary; 2499 has been acquired, 332 acres remaining to be acquired

Surplus Lands/Acreage: None

Public Involvement: ARC/DSL Land Management Review; Management Plan Advisory Group Plan Review; and Public Review.

DO NOT WRITE BELOW THIS LINE (FOR DIVISION OF STATE LANDS USE ONLY)

ARC Approval Date: _____ BTIITF Approval Date: _____

Comments: _____

Management Plan Compliance Checklist - Natural Resource Lands	
Requirements	Page Numbers
18-2.021 Acquisition and Restoration Council.	
1. Executive Summary (Example #1) This should be included in the packet and should be the first page.	✓
Management Plans. Plans submitted to the division for ARC review under the requirements of Section 253.034 F.S. should be in a form and manner prescribed by rule by the board and in accordance with the provisions of S. 259.032 and should contain where applicable to the management of resources the following:	
2. The common name of the property.	1
3. A map showing the location and boundaries of the property plus any structures or improvements to the property. (Example #2)	2,3 App C
4. The legal description and acreage of the property.	App B
5. The degree of title interest held by the Board, including reservations and encumbrances such as leases.	4, 5, App A
6. The land acquisition program, if any, under which the property was acquired.	4
7. The designated single use or multiple use management for the property, including other managing agencies.	53
8. Proximity of property to other significant State/local/federal land or water resources. (Example #3) May be included in the map in item #2.	5,6
9. A statement as to whether the property is within an Aquatic Preserve or a designated Area of Critical State Concern or an area under study for such designation. If yes, make sure appropriate managing agencies are notified of the plan.	56
10. The location and description of known and reasonably identifiable renewable and non-renewable resources of the property including, but not limited to, the following:	
A. Brief description of soil types, using U. S. D. A. maps when available;	12, 13, 14
B. Archaeological and historical resources*;	48, App H
C. Water resources including the water quality classification for each water body and the identification of any such water body that is designated as an Outstanding Florida Waters;	59
D. Fish and wildlife and their habitat;	35, 62
E. State and federally listed endangered or threatened species and their habitat;	38-44
F. Beaches and dunes;	N/A
G. Swamps, marshes and other wetlands;	18-25
H. Mineral resources, such as oil, gas and phosphate;	12
I. Unique natural features, such as coral reefs, natural springs, caverns, large sinkholes, virgin timber stands, scenic vistas, and natural rivers and streams; and	16, App G
J. Outstanding native landscapes containing relatively unaltered flora, fauna, and geological conditions.	16, App F
11. A description of actions the agency plans , to locate and identify unknown resources such as surveys of unknown archeological and historical resources.	48
12. The identification of resources on the property that are listed in the Florida Natural Areas Inventory. <i>Include letter from FNAI or consultant, where appropriate.</i>	App E
13. A description of past uses, including any unauthorized uses of the property. (Example #4)	49
14. A detailed description of existing and planned use(s) of the property. (Example #5)	51, App K
15. A description of alternative or multiple uses of the property considered by the managing agency and an explanation of why such uses were not adopted.	51-55
16. A detailed assessment of the impact of planned uses on the renewable and non-renewable resources of the property and a detailed description of the specific actions that will be taken to protect, enhance and conserve these resources and to mitigate damage caused by such uses.	52-96, App K
17. A description of management needs and problems for the property.	75-79
18. Identification of adjacent land uses that conflict with the planned use of the property, if any.	78
19. A description of legislative or executive directives that constrain the use of such property.	4
20. A finding regarding whether each planned use complies with the State Lands Management Plan adopted by the Trustees on March 17, 1981, and incorporated herein by reference, particularly whether such uses represent "balanced public utilization", specific agency statutory authority, and other legislative or executive constraints.	52, 92
21. An assessment as to whether the property, or any portion, should be declared surplus.	52
22. Identification of other parcels of land within or immediately adjacent to the property that should be purchased because they are essential to management of the property. Clearly defined map of parcels can be used.	5, 8, 10
23. A description of the management responsibilities of each agency and how such responsibilities will be coordinated, including a provision that requires that the managing agency consult with the Division of Historical Resources before taking actions that may adversely affect archaeological or historic resources. (Example #6)	55
24. A statement concerning the extent of public involvement and local government participation in the development of the plan, if any, including a summary of comments and concerns expressed. (Example #7)	9, App D

Management Plan Compliance Checklist - Natural Resource Lands	
Requirements	Page Numbers
Additional Requirements—Per Trustees	
25. Letter of Compliance of the management plan with the Local Government Comprehensive Plan. Letter from local government saying that the plan is in compliance with local government's comprehensive plan.	App M
253.034 State-Owned Lands; Uses. —Each entity managing conservation lands shall submit to the Division of State Lands a land management plan at least every 10 years in a form and manner prescribed by rule by the Board.	
26. All management plans, whether for single-use or multiple-use properties, shall specifically describe how the managing entity plans to identify, locate, protect and preserve, or otherwise use fragile nonrenewable resources, such as archaeological and historic sites, as well as other fragile resources, including endangered plant and animal species.	66, App H
27. The management plan shall provide for the conservation of soil and water resources and for the control and prevention of soil erosion.	59,94
28. Land management plans submitted by an entity shall include reference to appropriate statutory authority for such use or uses and shall conform to the appropriate policies and guidelines of the state land management plan.	1
29. All land management plans for parcels larger than 1,000 acres shall contain an analysis of the multiple-use potential of the parcel, which analysis shall include the potential of the parcel to generate revenues to enhance the management of the parcel.	53, App J, K
30. Additionally, the land management plan shall contain an analysis of the potential use of private managers to facilitate the restoration or management of these lands.	89
31. A physical description of the land.	1
32. A desired outcome	55,56
33. A quantitative data description of the land which includes an inventory of forest and other natural resources; exotic and invasive plants; hydrological features; infrastructure, including recreational facilities; and other significant land, cultural, or historical features.	Section II; App H, I, J, K
34. A detailed description of each short-term and long-term land management goal, the associated measurable objectives, and the related activities that are to be performed to meet the land management objectives. Each land management objective must be addressed by the land management plan, and where practicable, no land management objective shall be performed to the detriment of the other land management activities.	71-86
35. A schedule of land management activities which contains short-term and long-term land management goals and the related measurable objectives and activities. The schedule shall include for each activity a timeline for completion, quantitative measures, and detailed expense and manpower budgets. The schedule shall provide a management tool that facilitates development of performance measures.	71-86
36. A summary budget for the scheduled land management activities of the land management plan. For state lands containing or anticipated to contain imperiled species habitat, the summary budget shall include any fees anticipated from public or private entities for projects to offset adverse impacts to imperiled species or such habitats, which fees shall be used solely to restore, manage, enhance, repopulate, or acquire imperiled species habitat. The summary budget shall be prepared in such a manner that it facilitates computing an aggregate of land management costs for all state-managed lands using the categories described in s. 259.037(3).	86-88
37. Each management plan shall describe both short-term and long-term management goals, and include measurable objectives to achieve those goals. <i>Short-term and long-term management goals shall include measurable objectives for the following, as appropriate:</i> (A) <i>Habitat restoration and improvement;</i>	71-86
(B) <i>Public access and recreational opportunities;</i>	69, App K
(C) <i>Hydrological preservation and restoration;</i>	59
(D) <i>Sustainable forest management;</i>	60, App J
(E) <i>Exotic and invasive species maintenance and control;</i>	61
(F) <i>Capital facilities and infrastructure;</i>	68, App K
(G) <i>Cultural and historical resources;</i>	66
(H) <i>Imperiled species habitat maintenance, enhancement, restoration, or population restoration</i>	62
253.036 Forest Management. —	
38. For all land management plans for parcels larger than 1,000 acres, the lead agency shall prepare the analysis, which shall contain a component or section prepared by a qualified professional forester which assesses the feasibility of managing timber resources on the parcel for resource conservation and revenue generation purposes through a stewardship ethic that embraces sustainable forest management practices if the lead management agency determines that the timber resource management is not in conflict with the primary management objectives of the parcel. (Example #8)	App J

Management Plan Compliance Checklist - Natural Resource Lands	
Requirements	Page Numbers
259.032 Conservation And Recreation Lands Trust Fund; Purpose. —	
(10)(a) State, regional or local governmental agencies or private entities designated to manage lands under this section shall develop and adopt, with the approval of the Board of Trustees, an individual management plan for each project designed to conserve and protect such lands and their associated natural resources. Private sector involvement in management plan development may be used to expedite the planning process.	
39. Individual management plans required by s. 259.032(10)(b), for parcels over 160 acres, shall be developed with input from an advisory group - Management plan should list advisory group members and affiliations.	App D
40. The advisory group shall conduct at least one public hearing in each county in which the parcel or project is located. Managing agency should provide DSL/OES with documentation showing date and location of public hearing.	App D
41. Notice of such public hearing shall be posted on the parcel or project designated for management, advertised in a paper of general circulation, and announced at a scheduled meeting of the local governing body before the actual public hearing. Managing agency should provide DSL/OES with copy of notice.	App D
42. The management prospectus required pursuant to 259.032 (9)(d) shall be available to the public for a period of 30 days prior to the public hearing.	App D
43. Summary of Advisory Group Meeting should be provided to DSL/OES.	App D
44. Individual management plans shall conform to the appropriate policies and guidelines of the state land management plan and shall include, but not be limited to:	
A. A statement of the purpose for which the lands were acquired, the projected use or uses as defined in s. 253.034, and the statutory authority for such use or uses.	4, App C
B. Key management activities necessary to achieve the desired outcomes, including, but not limited to, providing public access , preserving and protecting natural resources, protecting cultural and historical resources , restoring habitat, protecting threatened and endangered species , controlling the spread of nonnative plants and animals, performing prescribed fire activities, and other appropriate resource management activities.	49-96, App I, J, K
C. A specific description of how the managing agency plans to identify, locate, protect, and preserve, or otherwise use fragile, nonrenewable natural and cultural resources.	App I, J, K, H
D. A priority schedule for conducting management activities, based on the purposes for which the lands were acquired. (Example #10) The schedule must include a goal, an objective, and a time frame for completion.	55-86
E. A cost estimate for conducting priority management activities, to include recommendations for cost-effective methods of accomplishing those activities. <i>Using categories as adopted pursuant to 259.037, F.S., is suggested. These are: (1) Resource Management; (2) Administration; (3) Support; (4) Capital Improvements; (5) Visitor Services/Recreation; and (6) Law Enforcement.</i>	86-88
F. A cost estimate for conducting other management activities which would enhance the natural resource value or public recreation value for which the lands were acquired. The cost estimate shall include recommendations for cost-effective methods of accomplishing those activities. <i>Using categories as adopted pursuant to 259.037, F.S., is suggested. These are: (1) Resource Management; (2) Administration; (3) Support; (4) Capital Improvements; (5) Visitor Services/Recreation; and (6) Law Enforcement.</i> (Example #10) Include approximate monetary cost and cost effective methods. Can be placed in the appendix.	86-88
45. A determination of the public uses and public access that would be consistent with the purposes for which the lands were acquired.	App K
259.036 Management Review Teams.—	
46. The managing agency shall consider the findings and recommendations of the land management review team in finalizing the required 10-year update of its management plan. <i>Can be addressed in the body of the plan or addressed in an appendix. If not in agreement, the managing agency should reply in a statement in the appendix.</i>	89, App L
Other Requirements	
47. This checklist table at front of plan (pursuant to request of ARC and consensus agreement of managing agencies.)	✓
48. Accomplishments (implementation) from last plan (format variable by agency)	7, 48, 86
49. FNAI-based natural community maps (may differ from FNAI in some cases)	27-34, App E
50. Fire management plans (either by inclusion or reference)(259.032)	App I
51. A statement regarding incompatible uses [ref. Ch. 253.034 (9)]	53-54
52. Cultural resources, including maps of all sites <u>except Native American sites*</u>	48, App H
53. Arthropod control plan	App N
*While maps of Native American sites should not be included in the body of the management plan, the DSL urges each managing agency to provide such information to the Division of Historical Resources for inclusion in their proprietary database. This information should be available for access to new managers to assist them in developing, implementing and coordinating their management activities.	✓

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Appendix B: Legal Description

Appendix C: DEP Approved Management Prospectus – Includes Optimum Boundary Map

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Appendix E: FNAI Letter Report

Appendix F: List of Plant Species Observed by Local Florida Native Plant Society Chapter

Appendix G: Scrub-Jay Survey

Appendix H: Archaeological and Historical Resources

Appendix I: Prescribed Burn Plan

Appendix J: Timber Assessment/Timber Plan

Appendix K: Recreation Plan

Appendix L: Land Management Review and Manager's Response

Appendix M: Letters of Compliance with Local Government Comprehensive Plan

Appendix N: Arthropod Control Plan

I. GENERAL INFORMATION

The following updated and revised management plan is submitted for review to the Board of Trustees of the Internal Improvement Trust Fund (BOT) of the State of Florida through the Department of Environmental Protection, Division of State Lands (DSL), in compliance with paragraph eight of Lease No. 4195 (Appendix A). The plan is intended to meet the requirements of Sections 253.034 and 259.032, Florida Statutes, Chapter 18-2, Florida Administrative Code, and intended to be consistent with the State Lands Management Plan. With approval, this management plan will replace the Plan approved by FDEP's Acquisition and Restoration Council (ARC) in March 2002. All development and resource alteration encompassed in this plan is subject to the granting of appropriate permits, easements, licenses, and other required legal instruments. Approval of the management plan does not constitute an exemption from complying with the appropriate local, state or federal agencies. The Plan has been formatted and content were drafted in accordance with ARC requirements for management plans and the model plan outline provided by the staff of DSL.

The Doris Leeper Spruce Creek Preserve contains many parcels that are not under state ownership. The total Preserve lands under public ownership is 2,477 acres. The reader of this Plan should note that the intended (required) purpose is to show that the County is appropriately managing state-owned lands (titles held in fee simple or less than fee simple by the BOT; 1,932 acres) as required by Florida Statutes and Florida Administrative Code. The focus of this Plan is on those particular state-owned parcels, and use of words such as "site" or "property" will refer to the state-owned parcels. It is realized that the Preserve as a whole is larger than these state-owned lands and for the purpose of management, the County considers the entire Preserve as one complete managed area.

A. Land Acquisition

1. Location

Doris Leeper Spruce Creek Preserve consists of 1,932 acres of state owned land within the Preserve in Volusia County, lying in Sections 22, 23, 25, 28, 29, 33, 34, 35, 36, and 38, Township 16 South, Range 33 East. Other adjacent, non-state owned conservation lands increase the total area to 2,477 acres. DLSCP is approximately 8 miles southeast of Daytona Beach and 43 miles northeast of Orlando. The property lies within three (3) local jurisdictions that include the City of Port Orange, the City of New Smyrna Beach, and Volusia County.

DLSCP is generally bordered on the north by Spruce Creek and Rose Bay, on the west by public lands along Interstate 95 on the south by developed and undeveloped private residential lands, and on the east by US Hwy 1, although some parcels do occur east of US 1. Several city and county owned forested properties are contiguous to and abut the DLSCP on several of its boundaries. The Preserve consists of tracts separated by Spruce Creek, Strickland Bay, Turnbull Bay, Murray Creek and US 1. For communication purposes, these tracts are referred to by individual name as shown on the Parcel Identification Map.

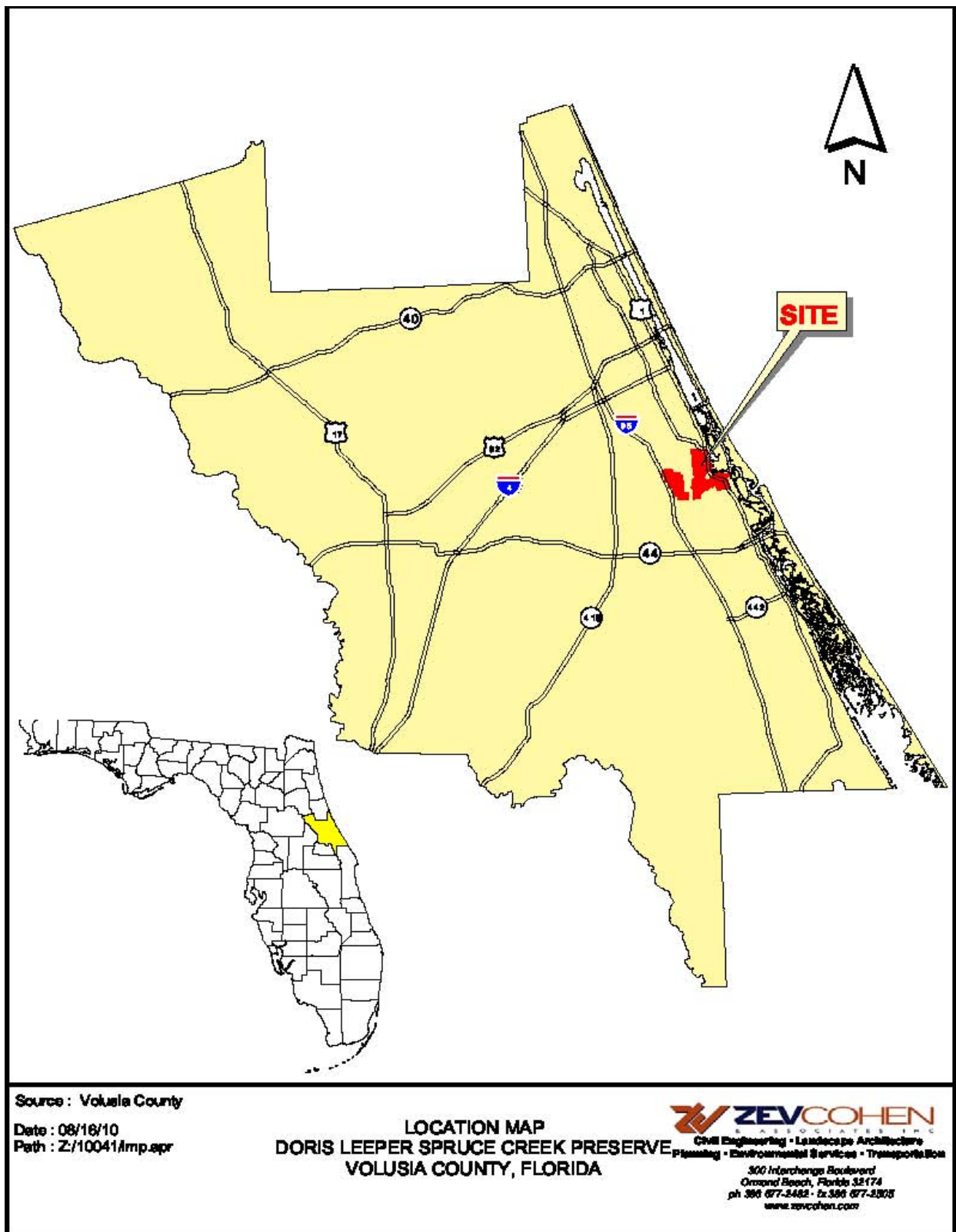


Figure 1. Location Map of the Doris Leeper Spruce Creek Preserve.

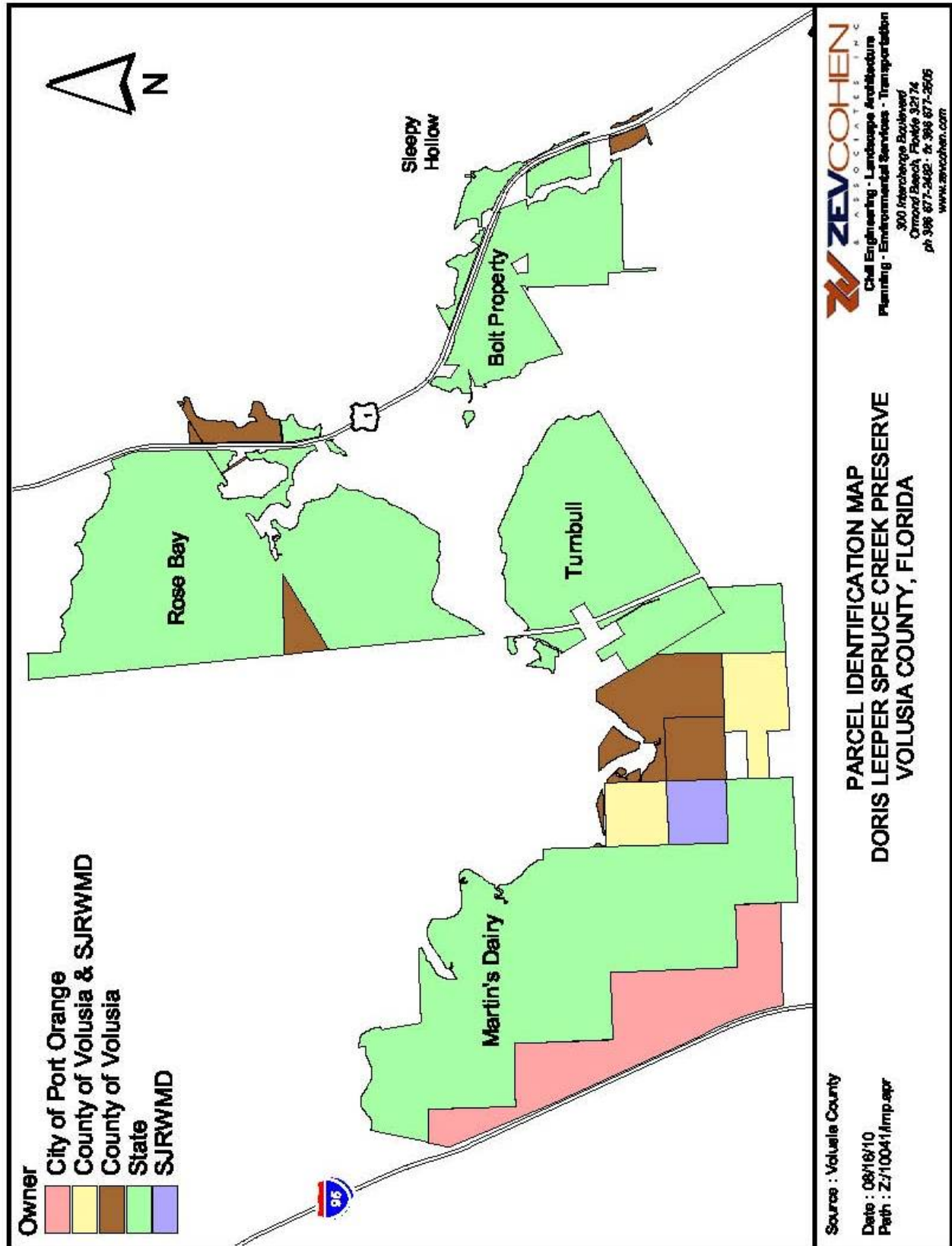


Figure 2. Parcel Identification Map of tracts at Doris Leeper Spruce Creek Preserve.

2. Purchase

The acquisition of DLSCP was begun in the mid-1980's, and involved several individuals, conservancy groups, and state and local governments and agencies. The Preserve was purchased through a joint effort with Volusia County and the State's Conservation and Recreation Lands (CARL) Program. Volusia County manages the land, although the State of Florida owns the property.

The purpose of the acquisition as described is here is summarized from DEP's Management Prospectus (Appendix C). One of the primary reasons for acquisition was to protect one of the largest undeveloped tracts in the region. Undeveloped land is rapidly disappearing due to the expanding development of adjacent urban areas. Additionally, the acquisition was sought to help maintain water quality of the adjacent creeks and bays, and would provide protection to important historical resources, including portions of the Andrew Turnbull plantation.

3. Management Authority

Volusia is the designated lead managing agency for DLSCP under the authority granted by Lease Number 4195.

4. Management Directives

This Management Plan is to guide the appropriate development of facilities that will provide access to the Preserve, while preserving the integrity of its natural and cultural resources. The plan identifies the objectives, criteria and standards that guide preserve development, administration and management and is intended to meet the requirements of Section 253.034, Florida Statutes and Chapter 18-2, Florida Administrative Code.

Florida Statutes, subsection 253.023(11) directs the County to manage the leased premises only for the conservation and protection of natural and historical resources and resource-based, public outdoor recreation which is compatible with the conservation and protection of these public lands.

Thus, the fundamental goal of the County as the managing agency is the protection and preservation of the natural and cultural historic resources of the Preserve and serves as the goal guiding management of the Preserve and its associated uses. In order to accomplish this goal, the County manages the Preserve in a two-tiered approach. The Volusia County Parks, Recreation & Culture Division (lead), in combination with the Environmental Management Division, are responsible for natural resource protection and preservation, including management activities noted within this Plan. The Volusia County Parks, Recreation and Culture Division is responsible for user group management, related to secondary user activities identified in Section III of this Plan. The division managers and individual staff communicate on a regular basis to ensure proper protection and preservation of the natural resources remains the primary goal. This division of labor allows the most equipped staff to handle appropriate management activities, from controlled burns to gate maintenance.

The Management Policy Statement from the Management Prospectus is as follows:

The primary goals of management of the Spruce Creek project are: to conserve, protect, manage, or restore important ecosystems, landscapes, and forests, in order to enhance or protect significant surface water, coastal, recreational, timber, fish or wildlife resources which local or state regulatory programs cannot adequately protect; to provide areas, including recreational trails, for natural-resource-based recreation; and to preserve significant archaeological or historical sites.

5. Title Interest and Encumbrances

Title to DLSCP, as State-owned lands, is held by the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (Lessor). In January, 2001 the Lessor entered into a lease agreement with Volusia County as lessee and lead manager of DLSCP (Appendix A). The term of this lease is 50 years.

B. Proximity to Other Public Properties

State owned lands within DLSCP are contiguous with a number of publicly owned conservation areas that are managed by Volusia County. The entire conglomerate of publicly owned and managed lands is considered the Preserve. As noted above, the region in which DLSCP located has experienced significant development pressure. As such, DLSCP does not have any direct land connections with other public lands. It does have numerous connections via waterways, including county and city owned parks and managed lands to the east and west. Additionally, numerous parcels that have been placed under Conservation Easements granted to regulatory agencies (primarily the St. Johns River Water Management District) have hydrologic connections via swamps and other watercourses that connect to Spruce Creek.

A map of conservation lands within a 10-mile radius of the Preserve is displayed below in the Public Conservation Lands Map. Volusia County is the managing agency for the publicly owned lands that are adjacent to BOT lands within DLSCP.

Some of the notable lands in the region along with the associated manager / owner include:

- Tiger Bay State Forest (includes Rima Ridge Wildlife Management Area): FL Division of Forestry
- Port Orange Mitigation Bank: City of Port Orange
- Longleaf Pine Preserve: Volusia County
- Gamble Place: Non-Profit Organization
- Ponce Preserve: City of Ponce Inlet
- Lighthouse Point: Volusia County
- Smyrna Dunes Park: Volusia County
- Farmton Mitigation Bank: Mitigation Associates, Inc.
- Turnbull Hummock: CARL Project – St. Johns River Water Management District

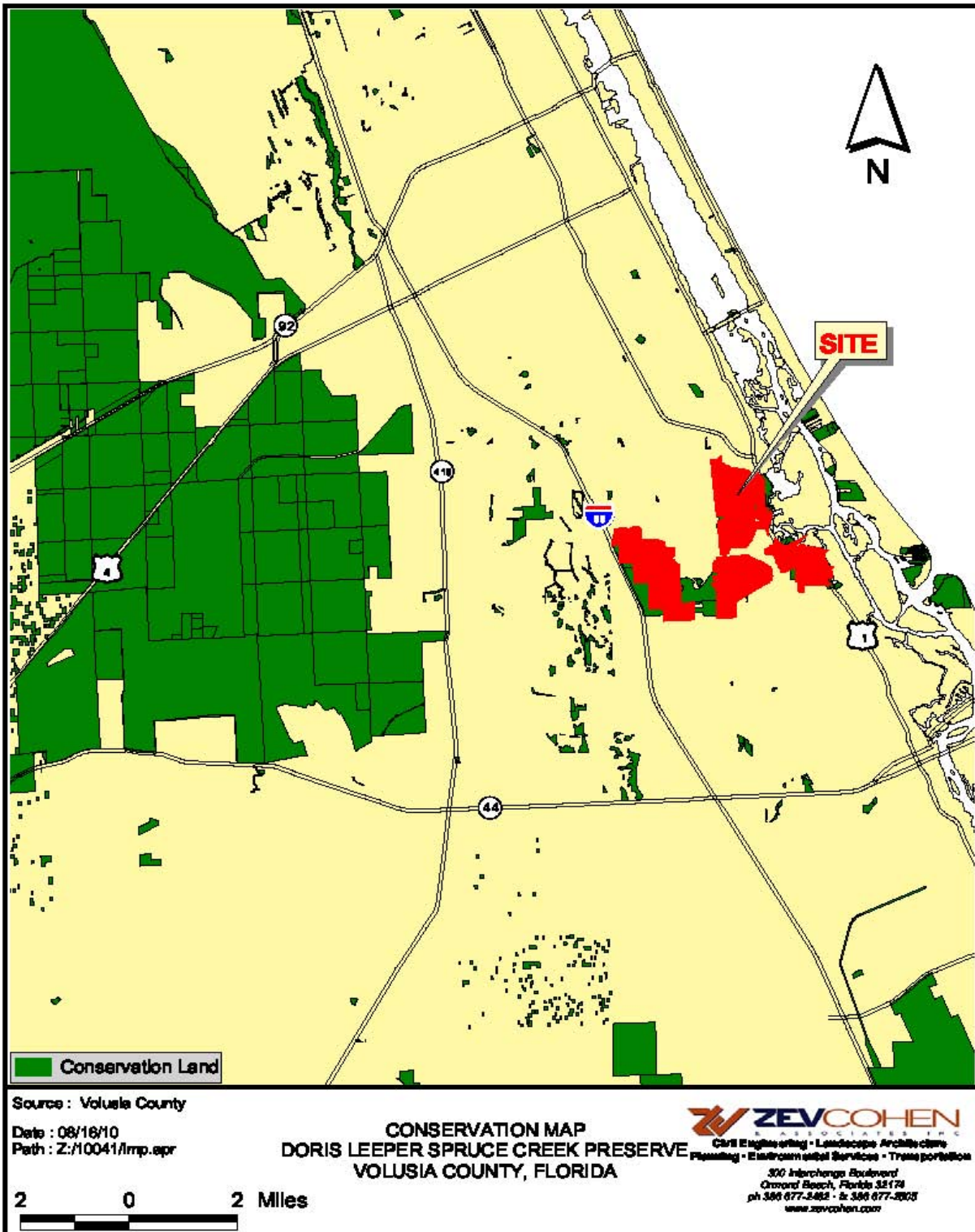


Figure 3. Conservation lands adjacent to and with in a 10-mile vicinity of Doris Leeper Spruce Creek Preserve.

C. Optimal Boundary

The optimum boundary is identified by the black boundary identified as the Florida Forever BOT Project Boundary on the Optimal Boundary Map. This map is from the DEP approved Management Prospectus, which is provided in its entirety in Appendix C. The purpose of the optimal boundary is to guide acquisition of parcels towards those parcels that would promote the Florida Forever goals and the goals listed within this Plan. Adjustments to the boundary and may add or remove parcels depending upon current conditions. If parcels that were formerly within an optimum boundary are developed, they may be removed from essential parcels list. Note that inclusion within this boundary does not equate to ownership. It is a guide to acquiring additional lands for public ownership and management.

The County, in partnership with others, has been able to acquire a significant portion of the properties within the Optimal Boundary. The acquisition of these lands is a significant focus of Volusia County's Environmental Management Division. The acquisition of these properties directly promotes the primary objective of the management directive noted above. The remaining properties include lands adjacent to the exterior boundaries of the overall publicly owned lands. As part of the management strategy, adjacent and contiguous lands are continuously reviewed and evaluated for potential incorporation into the Preserve's CARL/Florida Forever boundary. In 2008, with approval by ARC, six privately owned parcels totaling 96.97 acres were removed from the Optimal Boundary. This change reflected which properties should be targeted for acquisition; no parcels have been removed or sold from public ownership. These properties were reviewed by the Office of Environmental Services as part of a study to determine whether properties should be removed from the optimum boundary that have been disturbed by development and no longer desirable for state acquisition. The six parcels were found to contain residential and/or commercial infrastructure and /or buildings. .

The Doris Leeper Spruce Creek has been one of the several priority areas of the county-wide Volusia Forever program. The *Volusia Forever* program provides for the acquisition and management of environmentally sensitive and outdoor recreation lands. The program, created by the county's voters in 2000, is funded through annual ad valorem assessment for a period of twenty years. Potential future acquisitions through this program, which is for willing sellers only, is dependent upon available funding.

The *Volusia Forever* program is administered by the County's Environmental Management Division. The responsibility for final decisions regarding property acquisition resides with the County Council.

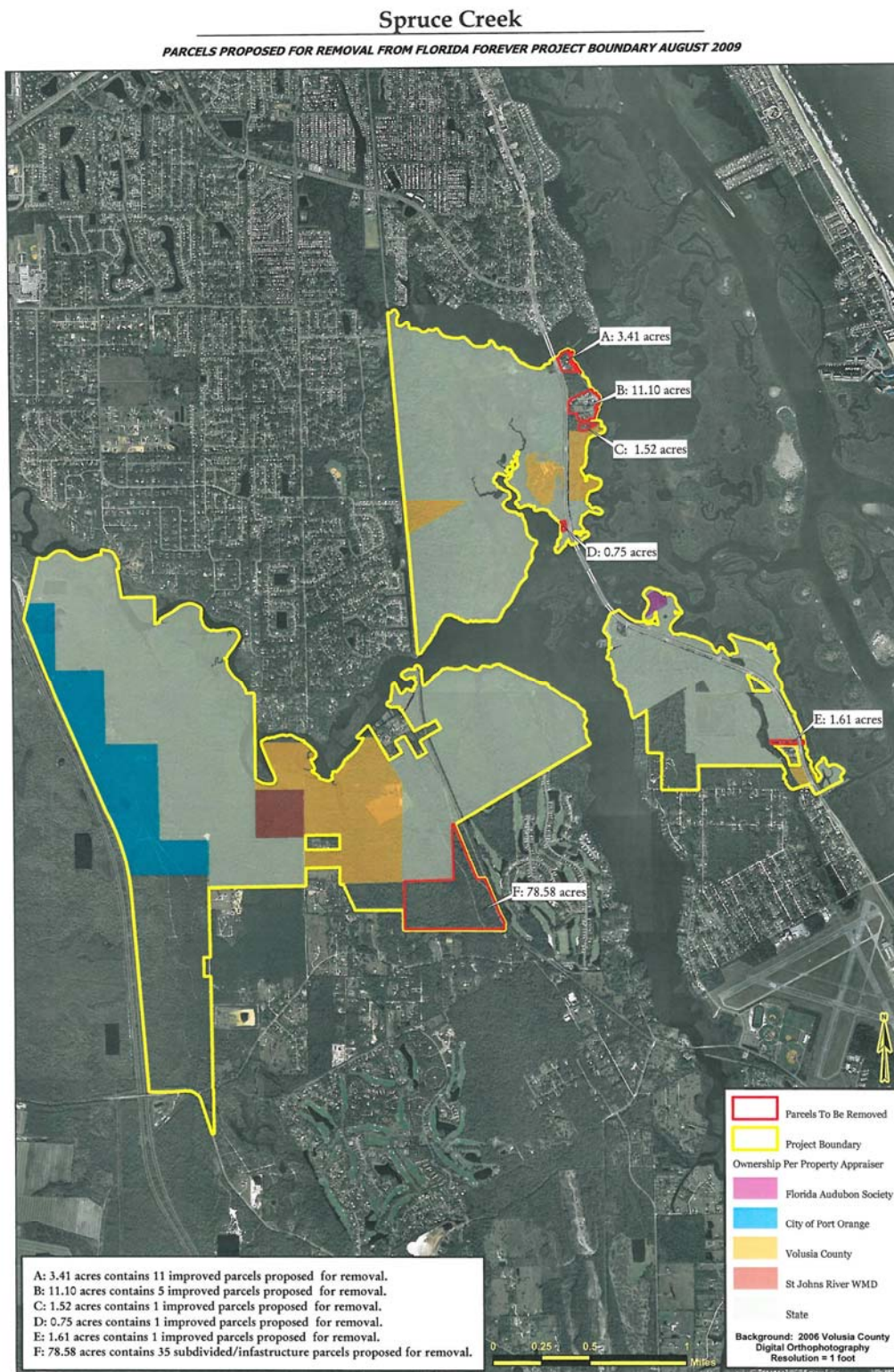


Figure 4. Optimal Boundary (shown in yellow) of the Doris Leeper Spruce Creek Preserve following revisions to the boundary approved in 2008.

D. Public Involvement

A public workshop was held on December 6, 2010. The purpose of this meeting was to present this draft management plan to the public. Comments from public input were considered and where logistical and not contrary to the primary purpose and goals of this Plan, were incorporated. The Florida Statute calls for the minimum of one public hearing.

Following review and input of the Plan at the public workshop, a Management Plan Advisory Group meeting was held on December 8, 2010. The County Council, in accordance with Section 259.032, Florida Statutes, established an advisory group that provided input into this Plan. The advisory group members consisted of representatives from the lead and co-managing agency, a local property owner, the soil and water conservation district, a local conservation organization, and a local elected official. The Council approved the formation of an advisory group for the purpose of reviewing and commenting on the Plan on its October 7, 2010 regularly scheduled public meeting.

II. NATURAL AND CULTURAL RESOURCES

A. Physiography

The following section provides a description and assessment of existing natural and cultural resources found in the Preserve. An Aerial Map and other supporting figures are provided in this section.

1. Topography

Elevations on this site range from 0 feet NGVD along the margins of Spruce Creek, Strickland Bay, Turnbull Bay and along the mangrove and marsh islands to 40 feet NGVD at the top of the Spruce Creek archeological mound and the bluffs along Spruce Creek. Higher elevations on the project site are associated with scrub, aboriginal shell mound deposits and bluffs along Spruce Creek, while lower elevations on the project site are associated with the margins of Spruce Creek and adjacent salt marsh and mangrove areas.

During the planning of recreational activities slope is a more important concern than actual elevations with regards to minimizing ecological impacts. On the project site, the steepest slopes are associated with the aboriginal shell mound areas and bluff areas in the western portion of the project site. Multi-use trails proposed in proximity to these areas should be field verified to avoid excessively sloped areas. This will minimize sedimentation and erosion problems in the future and protect surface water quality.

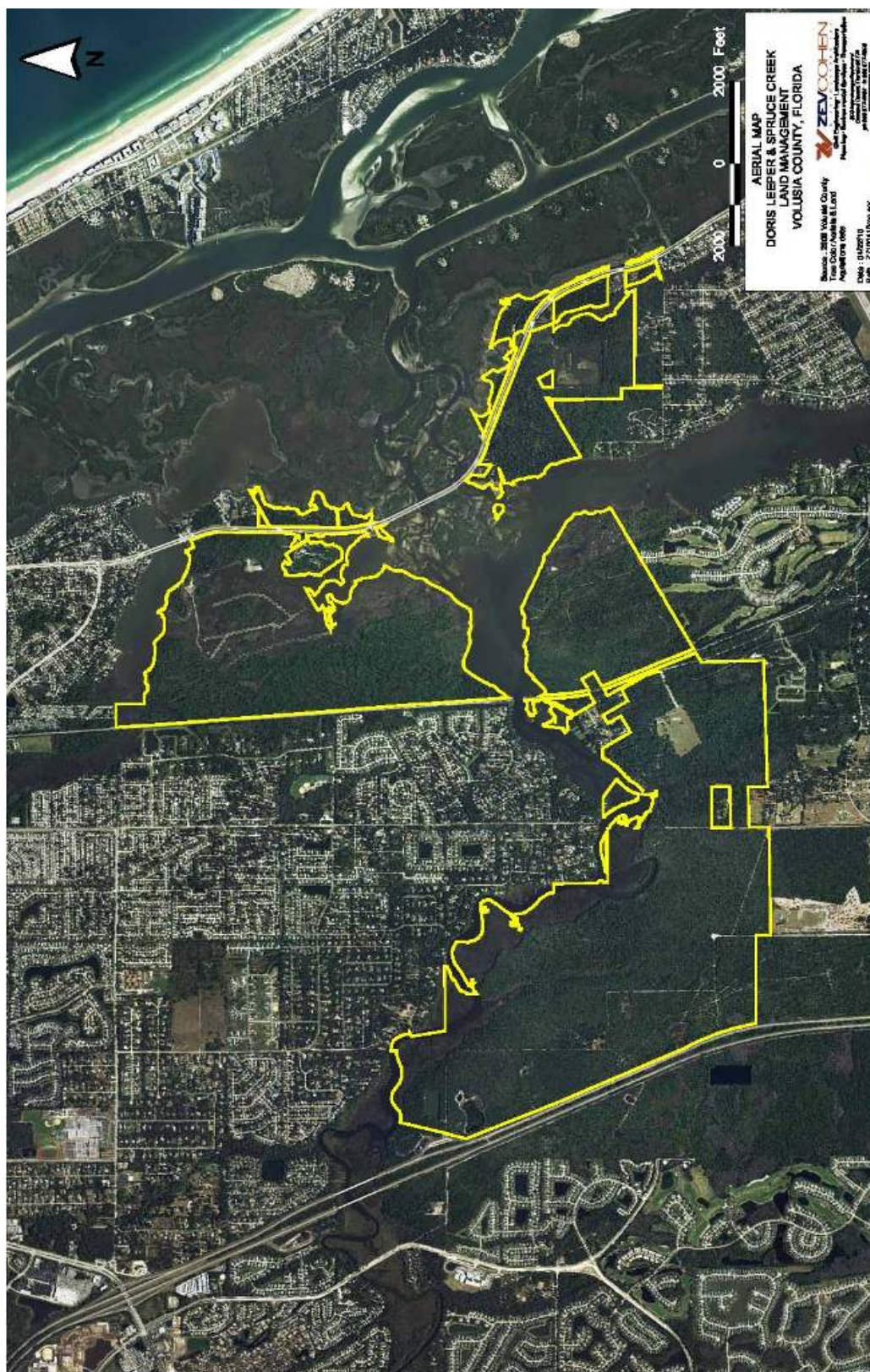


Figure 5. Aerial Map of Doris Leeper Spruce Creek Preserve.

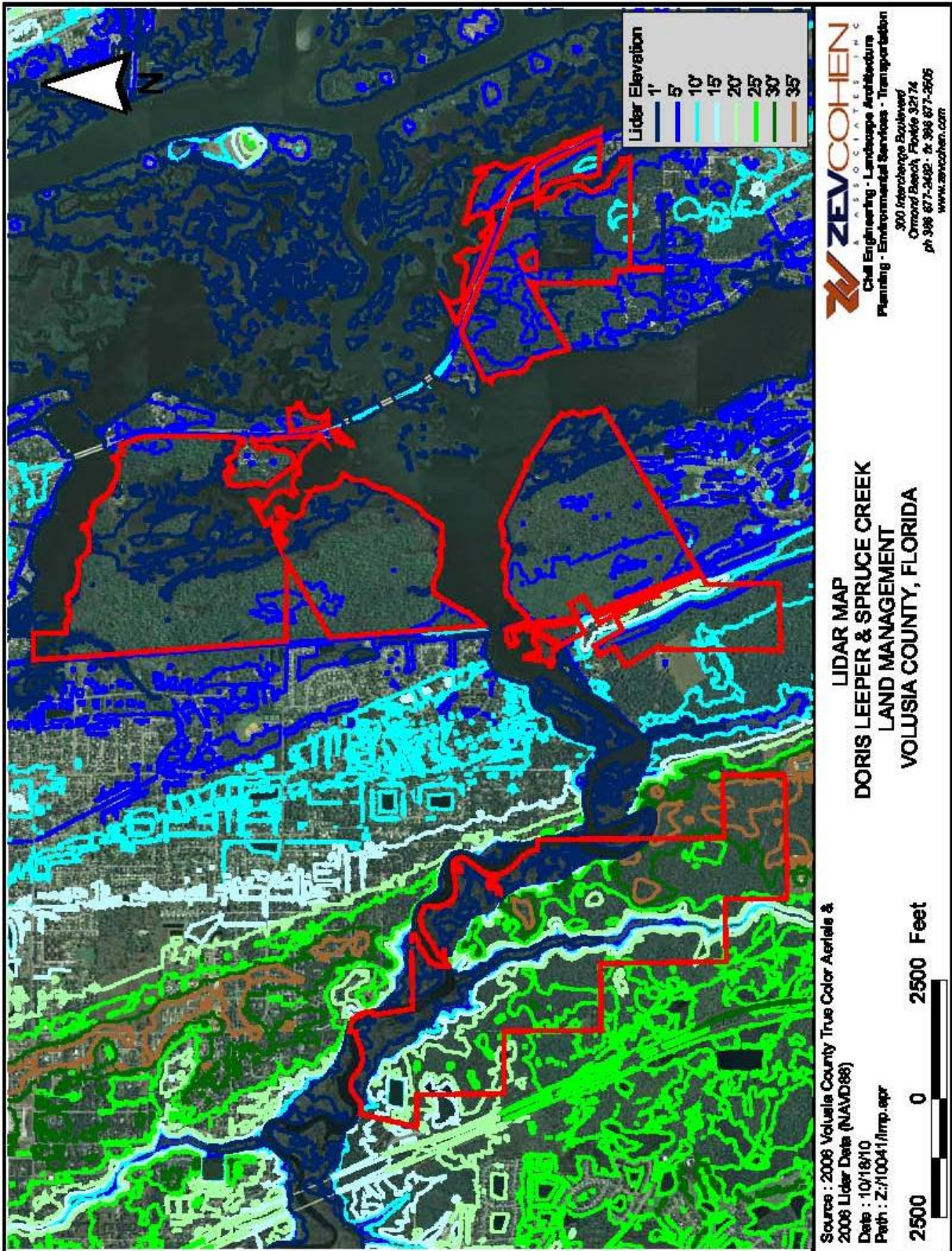


Figure 6. Topography of the Doris Leeper Spruce Creek Preserve as a digital elevation map derived from LIDAR data produced by Volusia County.

2. Soils

According to the United States Department of Agriculture (USDA) Soil Conservation Service Soil Survey of Volusia County (1980) (now the Natural Resource Conservation Service – NRCS), there are eighteen (18) soil map units that occur within the Preserve. These soil types, along with a brief description are listed in Table 2.1 below and displayed on the Soils Map. Revenue-generating mineral resources, such as oil, gas and phosphate, are not known to occur within the Preserve.

Soils on the project site provide insight into historic vegetation patterns, potential land uses, and appropriate plant selections for restoration areas. The dominant soil types in the uplands on the eastern portion of the site are Myakka fine sand and Smyrna fine sand, while the soils of the uplands on the western portion of the site are dominated by Paola fine sand, 0-8% slopes and Astatula fine sands, 0-8% slopes. The predominant wetland soil on the site, Turnbull muck, underlies the extensive salt marsh areas adjacent to Spruce Creek.

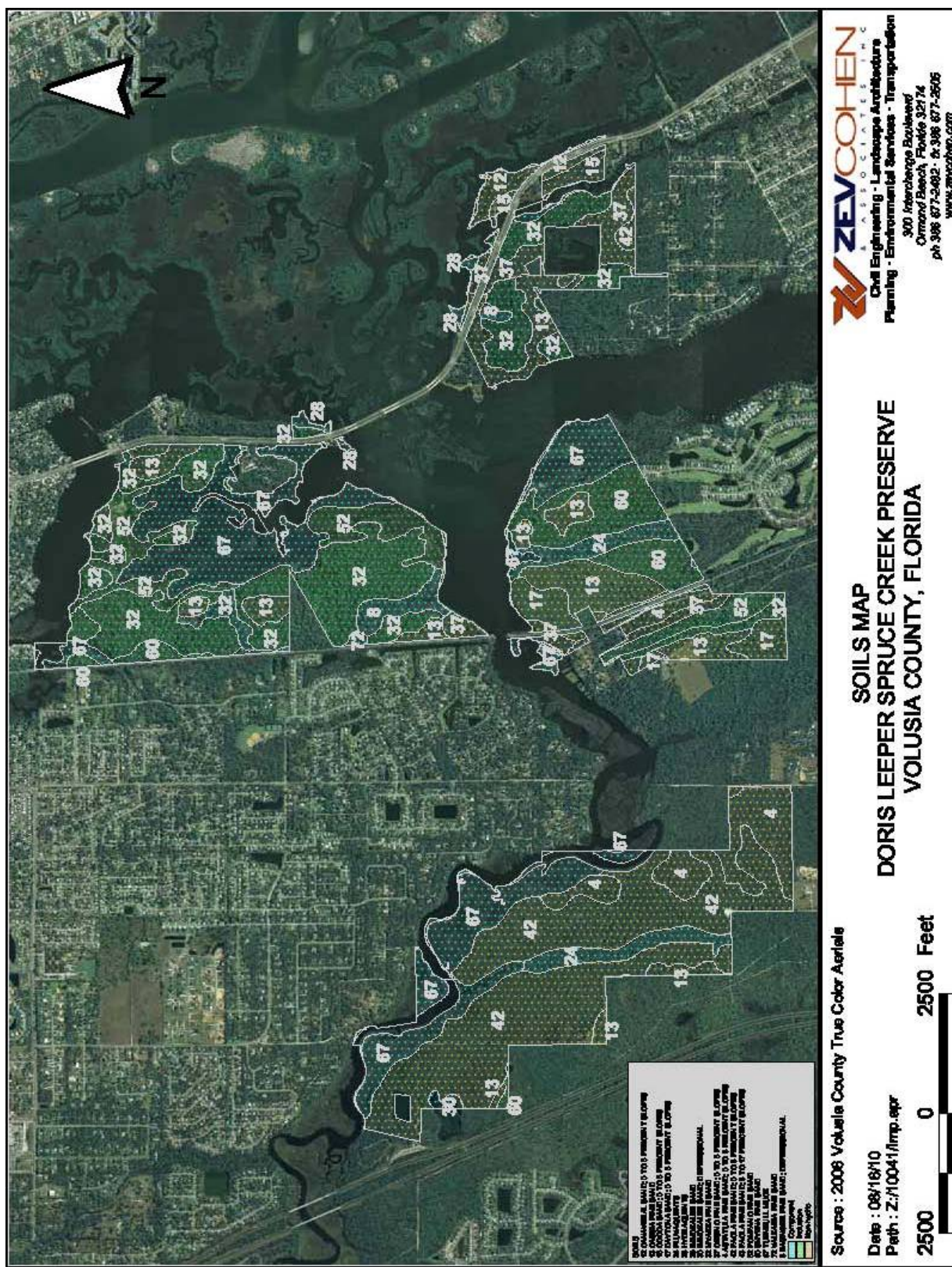
In the table below, the hydric status of the soil is listed as Component, Inclusion, or Xeric. The purpose of the rating is to understand, relative to the map unit, the extent of the hydric nature of the soil. Hydric component soils are those map units where the majority of the map unit is comprised of a hydric soil. Hydric inclusion soils are those where a minority percentage of the map unit consists of hydric soils. Xeric soils are those that have no hydric soils included within the map unit. These can also be considered in terms of hydric, mesic, and xeric across the landscape. Note that the use of terms *component* and *inclusion* are from terminology appearing in the 3rd Edition of the *Hydric Soils of Florida Handbook*, although the actual rating below are based on the 4th edition.

Table 2.1. Soil Types and Descriptions occurring on Doris Leeper Spruce Creek Preserve Project Site, Volusia County, Florida.

Soil Name and Map Symbol	Brief Soil Description	Seasonal High Water Table		Historic Vegetation	Hydric Status
		Depth (in)	Duration (mo)		
Astatula fine sand, 0-8% slopes (4)	Excessively drained; nearly level to sloping	>80	12	Sand pine, turkey oak, sand live oak, longleaf pine, wiregrass, gopher apple, saw palmetto	Xeric
Basinger fine sand, depressional (8)	Poorly drained, nearly level	At or above the surface	1-3	St. Johns wort. Maidencane, pond pine	Component
Canaveral sand, 0-5% slopes (12)	Moderately well drained to poorly drained; nearly level to gently sloping	10-40	2-4	Saw palmetto, scrub oaks	Xeric

Soil Name and Map Symbol	Brief Soil Description	Seasonal High Water Table		Historic Vegetation	Hydric Status
		Depth (in)	Duration (mo)		
Cassia fine sand (13)	Somewhat poorly drained; nearly level to gently sloping	15-40	6	Slash pine, longleaf pine, sand pine, scrubby oaks, saw palmetto, wiregrass	Xeric
Cocoa sand, 0-5% slopes (15)	Well drained; nearly level to gently sloping	>80	12	Live oak, laurel oak, magnolia, cabbage palm	Xeric
Daytona sand, 0-5% slopes (17)	Moderately well drained; nearly level to gently sloping	40-50	1-4	Sand pine, scrub oak, longleaf pine, rosemary, turkey oak, fetterbush, saw palmetto	Xeric
Fluvaquents (24)	Poorly drained and frequently flooded, nearly level	At or above surface	12	Red maple, cypress, sweetgum, cabbage palm, sedges	Component
Hydraquents (28)	Mangrove islands	Tidally influenced	12	Red mangrove, black mangrove	Component
Immokalee sand (29)	Poorly drained, nearly level	>10	1-2	Slash pine, longleaf pine, saw palmetto, wiregrass, runner oak	Inclusion
Immokalee sand, depressional (30)	Poorly drained, nearly level	<10	>6	Maidencane, St. Johns wort, cordgrass, pickerelweed	Component
Myakka fine sand (32)	Poorly drained, nearly level	<12	6	Slash pine, longleaf pine, saw palmetto, wiregrass	Inclusion
Orsino fine sand, 0-5% slopes (37)	Moderately well drained, nearly level to gently sloping	40-60	3-6	Sand pine, rosemary, saw palmetto	Xeric
Paola fine sand, 0-8% slopes (42)	Excessively drained, nearly level to sloping	>72	12	Sand pine, scrub oak, rosemary, saw palmetto	Xeric
Paola fine sand 8-17% slopes (43)	Excessively drained, strongly sloping to moderately steep	>72	12	Sand pine, scrub oak, rosemary, saw palmetto	Xeric
Pompano fine sand (52)	Poorly drained, nearly level	<10	2-6	Cordgrass, maidencane, St. Johns wort	Inclusion

Soil Name and Map Symbol	Brief Soil Description	Seasonal High Water Table		Historic Vegetation	Hydric Status
		Depth (in)	Duration (mo)		
Smyrna Fine sand (60)	Poorly drained, nearly level	<10	1-4	Slash pine, runner oak, saw palmetto, wiregrass	Inclusion
Turnbull muck (67)	Very poorly drained, nearly level	Tidally influenced	12	Needlegrass rush, smooth cordgrass, sea-oxeye, glasswort, saltgrass	Component
Turnbull variant sand (68)	Dredged material	<40	12	Pricklypear cactus, wax myrtle, cabbage, palm, pickerelweed, glasswort, spartina	Xeric



B. Natural Communities

The system of classifying natural communities employed in this plan was developed in accordance with the Florida Natural Areas Inventory (FNAI) *Guide to the Natural Communities of Florida – 2010 Edition*. The premise of this system is that physical factors, such as climate, geology, soil, hydrology and fire frequency generally determine the species composition of an area, and that areas which are similar with respect to these factors will tend to have natural communities with similar species compositions. Obvious differences in species composition can occur, despite similar physical conditions. In other instances, physical factors are substantially different, yet the species compositions are quite similar. For example, coastal strand and scrub--two communities with similar species compositions--generally have quite different climatic environments, and these necessitate different management programs.

The Preserve contains 17 communities (see Habitat Maps) including altered cover types. Preserve Specific assessments of the existing natural communities are provided in the narrative below and a summary of the communities and their relative cover and acreages is provided in the following table. The discussions below summarize the generalized condition of the community, followed by details of the specific community occurring within the Preserve. Details such as fire return intervals, timber thinning, and other specific restoration details are provided in separate plans within the Appendices.

Land Cover Classification	Acres	% Area	Fire Interval (yrs)	Fire Interval (yrs)
			Per Plan (typical for habitat)	Per Prescribed Fire Plan
Blackwater Stream	21.89	1.1	--	--
Bottomland Forest	65.46	3.4	--	--
Clearing	3.44	0.2	--	--
Coastal Hydric Hammock	7.48	0.4	--	--
Developed	9.76	0.5	--	--
Improved Pasture	4.85	0.3	--	--
Impoundment	5.01	0.3	--	--
Mangrove Swamp	15.19	0.8	--	--
Maritime Hammock	157.97	8.4	--	--
Mesic Flatwoods	281.59	14.6	2-4	2-4
Mesic Hammock	185.70	9.6	--	--
Salt Marsh	487.17	24.9	--	--
Scrub	280.04	14.5	5; 5-20	5-7
Scrubby Flatwoods	252.72	13.2	5-15	5-15
Successional Hardwood Forest	27.50	1.4		--
Wet Flatwoods	112.83	5.8	5-7	4-7
Wet Prairie	13.61	0.7	2-4	**
Total	1,932.20	100.0		

**Dependent upon adjacent habitats – see Prescribed Burn Plan, Appendix G.

Hardwood Forested Uplands

1. Mesic Hammock

Mesic Hammock – Mesic hammocks are well developed hardwood and/or palm forests on rarely inundated soils. The canopy is typically closed and dominated by live oak (*Quercus virginiana*), cabbage palm (*Sabal palmetto*), southern magnolia (*Magnolia grandiflora*), and pignut hickory (*Carya glabra*).

The mesic hammocks found at the Preserve are dominated by a closed canopy of the trees mentioned above. The understory consists of saw palmetto (*Serenoa repens*), American beautyberry (*Callicarpa americana*), gallberry (*Ilex glabra*), sparkleberry (*Vaccinium arboreum*), yaupon holly (*Ilex vomitoria*) as well as some scrub oak species found in the adjacent xeric habitats (these scrub oaks may be remnants of a historical condition, as described below). The mesic hammocks found on the Preserve, like many throughout central and northeast Florida, are very healthy and functioning at optimum levels. The most common disturbance in this habitat is logging, understory clearing, cattle grazing, and introduction of feral hogs. The disturbances mentioned above have not occurred at the Preserve.

The mesic hammocks located on the Martin's Dairy tract are located along a bluff bordering the bottomland forest / creek systems and also extend east to the bluff along Spruce Creek. These areas are within natural fire shadows and have trended towards a mesic setting. Based on the underlying soil map unit (42, Paola fine sand) the areas above the bluffs may have been historically more xeric in appearance and vegetational composition. Soils within these specific hammocks indicate an intermediate condition of these two communities (xeric vs. mesic). Void of natural processes such as fire, xeric hammocks drift towards mesic hammocks. As the canopy closes, large canopy oaks become resistant to fire, hardwoods like southern magnolia encroach, and the growing layer of leaf litter increase organics and cover open sand patches associated with xeric hammocks. As such, mesic hammocks are not considered fire-adapted communities due to their resistance to fire. Evidence of some hammock in these areas is visible on the 1943 aerials.

Based on these conditions, portions of the mesic hammock on the Martin's Dairy tract may be targeted for timber harvest and scrub restoration. This would be targeted only to those areas above the bluffs along either creek system and would occur along borders adjacent to scrub restoration areas.

High Pine and Scrub

2. Scrub

Scrub – The Scrub is a community composed of evergreen shrubs, with or without a canopy of pines, and is found on dry, infertile, sandy ridges.

Scrub within the Preserve is dominated by myrtle oak (*Quercus myrtifolia*), sand live oak (*Quercus geminata*), Chapman's oak (*Quercus chapmanii*), and rusty lyonia (*Lyonia ferruginea*) within the shrub and subcanopy strata. There are a few remnant stands of sand pine (*Pinus clausa*) in the canopy, but these appear to be declining in abundance. The oaks form a dense cover interspersed

with few patchy openings that consist of bare sand with a sparse cover of herbs, particularly threeawns (*Aristida* spp.), hairsedges (*Bulbostylis* spp.), sandyfield beaksedge (*Rhynchospora megalocarpa*), pinweeds (*Lechea* spp.), and ground lichens (*Cladonia* spp.). Saw palmetto (*Serenoa repens*) is common but not dominant within the scrub. Overall, the majority of all the scrub onsite is overgrown and not in habitat maintenance condition. As a whole, the scrub community requires restoration and will require fire surrogate activities prior to fire implementation.

Florida scrub is home to a multitude of rare animals. This includes the Florida scrub-jay (*Aphelocoma coerulescens coerulescens*), scrub lizard (*Sceloporus woodi*), gopher tortoise (*Gopherus polyphemus*), Florida mouse (*Peromyscus floridanus*), short-tailed snake (*Stilosoma extenuatum*), gopher frog (*Rana capito*), and many other species. Protected species found within the scrub are discussed in Section D, below.

While scrub is a fire-maintained community, it is not easily ignited. Scrub is thought to have burned less frequently than communities with a more easily ignited grassy groundcover, such as sandhill or mesic flatwoods. Scrub oak dominated scrub, as found within the Preserve, likely burned naturally at intervals between 5 and 20 years (based on the habitat requirements of the Florida scrub-jay). Oak height is a critical limiting factor for Florida scrub-jays which have been documented to abandon territories where the oaks reached >3 meters. A minimum five year fire return interval appears to be the time required for re-sprouting oak stems to reach acorn-bearing height, an important food source for jays.

Growth rates of scrub oaks are related to burn history and environmental conditions onsite. Long unburned oak scrub, which is found on the Preserve, may attain heights unsuitable for scrub-jays up to 50 percent faster after fire than regularly burned oak scrub and thus may at first require shorter burn intervals to maintain optimum heights following restoration of burning. In addition, small openings, needed by Florida scrub-jays for caching acorns, may need to be artificially restored in long unburned scrub by piling up fuel to create hotspots that kill the roots of the oaks.

Details on fire return intervals and mechanical harvesting of woody material are provided in the Prescribed Burn Plan and Timber Assessment / Timber Plan, in the Appendices.

Pine Flatwoods and Dry Prairie

3. Wet Flatwoods

Wet Flatwoods – Wet flatwoods are pine forests with a sparse or absent midstory and a dense groundcover of hydrophytic grasses, herbs, and low shrubs.

The wet flatwoods within the Preserve consists of a closed canopy of large slash pine (*Pinus elliotii*) and pond pine (*P. serotina*), with the latter being the dominant species. The subcanopy consists of loblolly bay (*Gordonia lasianthus*), swamp bay (*Persea palustris*), dahoon holly (*Ilex cassine*), and wax myrtle. The shrub layer is dominated by gallberry (*Ilex glabra*), shiny lyonia (*Lyonia lucida*), and saw palmetto (*Serenoa repens*). This habitat has been long unburned and saw palmetto forms a dense thicket and has low plant richness. The herbaceous species are found primarily in breaks in the shrub layer, along field roads or game trails and consists of wiregrass (*Aristida stricta*), blue

maidencane (*Amphicarpum muhlenbergianum*), Carolina redroot (*Lachnanthes carolina*), beaksedges (*Rhynchospora* spp.), and maidencane (*Panicum hemitomon*). Due to this site being fire suppressed the shrub layer is more abundant compared to the herbs. This community is found entirely within the Rose Bay Tract and is not considered to be within habitat maintenance conditions.

Wet flatwoods tend to have a longer fire interval than upland pine flatwoods in the order of 5 to 7 years. If the interval is too long, 7 to 10 years, it can lead to an increase in woody species cover and a decline in grasses and forb cover (or palmetto cover, as evidenced in this habitat on DLSCP). Many factors other than frequency of fire, such as season of fire, pre- and post-fire soil moistures, groundwater levels, weather, plant size or age at the time of fire, can greatly influence tree mortality and vegetation response to fire. Fire in the growing season can reduce the stature of woody vegetation, particularly hardwoods, prevent increases in shrub densities, and promote flowering of herbaceous groundcover.

4. Mesic Flatwoods

Mesic Flatwoods – Mesic flatwoods are generally characterized by an open canopy of tall pines and dense ground cover including shrubs, grasses, and forbs. Historically this community's canopy was dominated by longleaf pine (*Pinus palustris*). Today the majority of mesic flatwoods found throughout central and northeastern Florida are dominated by dense stands of slash pine due to the pine silviculture industry and furthermore by prolonged periods of fire exclusion.

The canopy found within the mesic flatwoods of the Preserve is comprised primarily of slash pine, however, longleaf pine does occur throughout much of this habitat on DLSCP. The ground cover is dominated by a heavy cover of saw palmetto and gallberry, and has low plant species richness compared to optimal conditions. In its natural state, mesic flatwoods herbaceous cover is dominated by wiregrass, dropseeds (*Sporobolus* spp.), panicgrasses (*Dichanthelium* spp.), and broomsedges (*Andropogon* spp.). Limited areas of wiregrass, and these other herbaceous species, are found within the mesic flatwoods of the Preserve due to fire exclusion. The herbaceous species that do occur are found along existing trails or other disturbances that have removed some of the extensive shrub layer. The mesic flatwoods found on the eastern portion of the Turnbull Tract are the closest to maintenance condition, but will still require mechanical treatments prior to fire implementation. The remaining mesic flatwoods are not in maintenance condition due to an overgrown shrub layer and closed canopy.

Mesic flatwoods require frequent fire (2 to 4 year intervals). Longleaf pines have thick bark to protect them from fire and their seeds need the mineral soil and open sunlight that fire provides to germinate. Longleaf pine during the grass stage is fire resistant. Several species require fire to reproduce. Wiregrass requires fire to flower, along with a number of other characteristic herbs.

The need for frequent fire to control hardwoods, shrub thickets and unnaturally dense pine stands has been documented for many years. It is also well documented that fire stimulates flowering in many flatwoods herbs and that frequent fire increases species richness and abundance. Controlled burns in mesic flatwoods also indirectly determine the fire frequency and season for all the adjacent natural communities.

Statistics from lightning caused fires suggest that most areas in Florida would naturally burn at the

beginning of the lightning season. Growing season fires (April to mid-August) are known to be necessary for flowering and seed set in wiregrass.

5. Scrubby Flatwoods

Scrubby Flatwoods – Scrubby flatwoods have an open canopy of widely spaced pine trees and a low, shrubby understory dominated by scrub oaks and saw palmetto. Scrubby flatwoods differ from the aforementioned scrub in the presence of wiregrass, a greater abundance of saw palmetto, and/or the presence of typical flatwoods shrubs such as gallberry and fetterbushes. Structurally it differs from scrub in its lack of a continuous cover of scrubby oaks.

The scrubby flatwoods at the Preserve have a canopy of longleaf pine, slash pine, and sand pine (*Pinus clausa*). The understory consists of a closed cover of sand live oak, myrtle oak, Chapman's oak, saw palmetto, gallberry, rusty Lyonia and fetterbush. Some instances of grasses were found which include wiregrass, broomsedge bluestem (*Andropogon virginicus*), and shiny blueberry (*Vaccinium myrsinites*). The majority of the scrubby flatwoods found within the Preserve has a closed canopy of scrub oaks in the 3 to 4 meter range in height due to the lack of fire. About 10% of the scrubby flatwoods may be considered in a maintenance condition, but these are scattered small pockets, not large enough to map individually. Overall, the scrubby flatwoods will require some fire surrogate activities prior to implementing controlled burns.

Scrubby flatwoods are often associated with scrub and/or mesic flatwoods. Therefore many of the rare species associated with the aforementioned scrub are also likely to inhabit scrubby flatwoods.

Scrubby flatwoods have a more continuous ground cover and more pine needle leaf litter than scrub; therefore historically have burned more readily than scrub. But due to less ground cover grasses, scrubby flatwoods tend to burn less readily than mesic flatwoods. Therefore scrubby flatwoods historically have burned at a frequency intermediate of the two, most likely in the 5 to 15 year range. Light ground fires in the surrounding mesic flatwoods tend to enter scrubby flatwoods and extinguish, leading to a patchwork of recently burned and unburned portions, a situation which has been found to be favorable for scrub-jays. Therefore variability in season and frequency of prescribed fires to produce a mosaic of burned and unburned patches would be the most desirable for maintaining high biotic diversity within this community.

Coastal Uplands

6. Maritime Hammock

Maritime Hammock – Maritime hammock is predominantly evergreen hardwood forest growing on stabilized coastal dunes lying at varying distances from the shore.

The maritime hammocks found within the Preserve have a closed canopy dominated by live oak, cabbage palm, southern magnolia, and pignut hickory. The subcanopy is dominated by red cedar (*Juniperus virginiana*), yaupon holly (*Ilex vomitoria*), saw palmetto, Brazilian pepper, red bay (*Persea borbonia*), wild coffee (*Psychotria nervosa*), wax myrtle, and wild orange (*Citrus* spp.). The invasive exotic Australian pine (*Casuarina equisetifolia*) was also noted within the maritime

hammock communities of the Preserve, although it is limited in occurrence. Aside from continual threat of invasive exotics along the perimeter (especially along U.S. 1 and former field roads which have been closed), this system is considered good quality and in maintenance condition. No large stands of exotics are present and no major restoration activities appear necessary.

Fire is naturally rare in this community. Fire could weaken the canopy trees making them more susceptible to damage by other coastal stresses. Invasion by exotic species such as Brazilian pepper and Australian pine following storm and wind disturbance is an ongoing threat to the community. Also the composition of maritime hammock is in danger to be affected by the Laurel Wilt Disease, which is fatal to red bays over 1 inch in dbh. This disease is caused by an exotic wood-boring beetle (*Xyleborus glabratus*). The loss of red bays within the subcanopy could potentially lead to further invasion by Brazilian pepper.

Freshwater Non-Forested Wetlands

7. Wet Prairie

Wet Prairie – Wet prairie is an herbaceous community found on continuously wet, occasionally inundated, soils on somewhat flat or gentle slopes between lower lying depression marshes, shrub bogs, or dome swamps and within slightly higher wet or mesic flatwoods, or dry prairies.

The wet prairies found within the Preserve are small depressions within wet flatwoods and mesic flatwoods. The groundcover consists primarily of yellow eyed grass (*Xyris* spp.), St. John's wort (*Hypericum fasciculatum*), maidencane, panic and witch grasses (*Panicum* spp, and *Dichanthelium* spp.), beaksedges, and Carolina redroot. Woody / shrubby species such as wax myrtle (*Myrica cerifera*) and Carolina willow are encroaching from perimeter, however the central portions remain open, herbaceous pockets that appear healthy, despite lack of fire.

Natural fires likely entered wet prairies from surrounding pine flatwoods and burned through them when they were dry enough to carry fire. It is estimated that wet prairies found adjacent to pine flatwoods historically had a fire interval of 2 to 4 years. In absence of fire, shrubs and trees invade wet prairie and shade out the light-loving herbaceous species. Further evidence of fire interval is the necessity of many of the dominant grasses that require fire to stimulate flowering. Wet prairies are sensitive to relatively slight physical alterations to the soil surface which can permanently alter the hydrology. Such disturbances include soil rutting by human disturbance or hog rooting. These disturbances can cause major changes in species composition that require expensive restoration to repair.

Freshwater Forested Wetlands

8. Coastal Hydric Hammock

Coastal Hydric Hammock – Coastal hydric hammock is an evergreen hardwood and/or palm forest with a variable understory typically dominated by palms and ferns occurring on moist soils, often with limestone very near the surface. While species composition varies, the community generally has a closed canopy of oaks and palms, an open understory, and a sparse to a moderate groundcover

of grasses and ferns.

The coastal hydric hammock found within the Preserve has a canopy which is 100% cabbage palm. The subcanopy consists of swamp bay, wax myrtle, and saw palmetto. The herbaceous cover is dominated by Virginia chain fern (*Woodwardia virginica*), cinnamon fern (*Osmunda cinnamomea*), and royal fern (*Osmunda regalis* var. *spectabilis*).

Fire is not considered an important component of coastal hydric hammock dynamics; however they do burn occasionally. Due to this coastal hydric hammock being dominated by old growth cabbage palm fire most likely occurred historically. Cabbage palms are fire tolerant and intense fires favor the species. Feral hogs tend to be the most common cause of disturbance to this habitat. Hog rutting causes soil disturbance which can allow the spread of the exotic Brazilian pepper as it is found directly adjacent to this habitat.

9. Bottomland Forest

Bottomland Forest – Bottomland forest is a deciduous, or mixed deciduous/evergreen closed-canopy forest within riverine floodplains and in shallow depressions.

The dominant canopy species found within this community at the Preserve include laurel oak (*Quercus laurifolia*), sweetbay (*Magnolia virginiana*), cabbage palm, swamp tupelo (*Nyssa sylvatica* var. *biflora*), water oak (*Quercus nigra*), sugarberry (*Celtis laevigata*), American elm (*Ulmus americana*), sweetgum (*Liquidambar styraciflua*) and red maple (*Acer rubrum*). The understory consists of blue beech (*Carpinus caroliniana*), swamp dogwood (*Cornus foemina*), dahoon holly (*Ilex cassine*), swamp bay, shiny lyonia (*Lyonia lucida*), buttonbush (*Cephalanthus occidentalis*) and wax myrtle. Common groundcover species include witchgrasses, woodoats (*Chasmanthium* sp.), and cinnamon fern (*Osmunda cinnamomea*). Overall, the bottomland forests within the Preserve are in excellent condition, have closed, mature canopies, do not appear to suffer from hydrologic impacts related to upstream development and have little exotic species present.

There are three bottomland forests occurring within the Preserve, two of which occur within state owned lands (the one not on state-owned land is intermediate in nature between the two described as follows). One of these, located within the Martin's Dairy tract, borders a narrow blackwater creek that extend southward beyond the tract, with a drainage basin extending beyond the limits of the optimal boundary. The bottomland forest here occurs along a minor bluff extending from the creek upwards in elevation to various xeric and mesic habitats. The plant species composition, likewise, extends from more hydrophytic to mesophytic in nature as this increase in elevation occurs. The shrub layer is moderate in abundance as is the groundcover layer. Open ground, covered in leaf litter, is visible throughout much of this habitat.

The community on the Turnbull Tract occurs along a drainage pathway. An ill-defined channel exists throughout the northern two-thirds of this habitat, but does not have the appearance or regular flow of a creek. This forest does not have the same geographic relief, so the transition from hydrophytic to mesophytic vegetation is less notable. The shrub layer is thicker in this system, and the herbaceous groundcover species tend to occur in small depressional pockets. Bottomland forests are a preferred habitat for the Florida black bear (*Ursus americanus floridanus*)

as they roam along the banks of streams and riverine systems.

Bottomland forests are not considered fire-adapted communities. The most common disturbance of bottomland forest is logging and introduction of feral hogs. The bottomland forests found within the Preserve do not appear to have been logged in the past and hog presence was not found. Other disturbances such as man made dikes or dams which do not allow for adequate drainage also can cause considerable damage to bottomland forests. No damming or diking has occurred within the Preserve.

Marine and Estuarine Vegetated Wetlands

10. Salt Marsh

Salt Marsh – Salt marsh is a largely herbaceous community that occurs in the portion of the coastal zone affected by tides and seawater and protected from large waves, either by the broad, gently sloping topography of the shore, by a barrier island, or by location along a bay or estuary.

In the case of the Preserve the salt marshes are protected from wave activity by barrier islands. The dominant species are smooth cordgrass (*Spartina alterniflora*) and needle rush (*Juncus roemerianus*). The landward edge of the marsh consists of sawgrass (*Cladium jamaicense*), saltmeadow cordgrass (*Spartina patens*), marsh elder (*Iva frutescens*), sea oxeye daisy (*Borrchia frutescens*), and christmasberry (*Lycium carolinianum*). The salt marshes within the Preserve also have sporadic black mangroves (*Avicennia germinans*).

Salt marshes, along with mangrove swamps, are some of the most biologically productive natural communities in the world. The base of the food chain is supplied not only by the rooted plant matter, but also by the algae and detritus found of the stems of plants, on the sediment surface, and suspended in the water column of pools and tidal creeks.

Fire is known to occur in salt marshes, although sporadically, either by spreading from adjacent uplands or from lightning strikes in the marsh itself.

The overall quality of the salt marshes through the Preserve is high. There are some impacts that have occurred, however. Ditch/canal features are found in a portion of the salt marshes on the Preserve. The ditching is consistent to what occurred in the area in the 1950's and 1960's which is referred to as dragline ditching. The purpose of the ditches was to interrupt the life cycle of saltmarsh mosquitoes (*Aedes taeniorhynchus*, *A. sollicitans*) by altering their breeding sites. Saltmarsh mosquitoes lay their eggs on moist soils. These eggs hatch in huge numbers when the marsh is flooded by tides or rain. Dragline ditching converts large acreages to ditch and spoil piles while altering the hydrology of the remaining wetland and providing access for mosquito-eating fish. The ditches are mostly open water due to the depth. Nuisance species such as Brazilian pepper, cattail (*Typha* spp.) and Carolina willow (*Salix caroliniana*) may invade along these edges, but this has occurred on a limited basis within the Preserve. Backfilling of these historic mosquito ditches has been a very successful form of salt marsh restoration throughout the state. This effort is occurring on the Preserve as well (refer to Section IV, Hydrologic Preservation and Restoration for additional details). In regards to the exotic species just mentioned, these also continue to invade the upper elevation of these systems along border between the salt marsh and the adjacent

terrestrial community. The most common species is Brazilian pepper. County staff, assisted by their Mosquito Control Program, continues to monitor and treat these areas. The percentage of salt marsh infested by nuisance species is low (ca. <5%).

11. Mangrove Swamp

Mangrove Swamp – Mangrove swamps are dense forests occurring along relatively flat, low wave energy, marine and estuarine shorelines. Four species of mangroves occur in Florida consisting of red mangrove (*Rhizophora mangle*), black mangrove, white mangrove (*Laguncularia racemosa*), and buttonwood (*Conocarpus erectus*). The four species can occur either in mixed stands or often in differentiated, monospecific zones that reflect varying degrees of tidal influence, levels of salinity, and types of substrate. Red mangroves often dominate the lowest (deep water) zone, followed by black mangroves, then white, and finally buttonwoods which are normally found within the transition zone between the upland and wetland limits.

The mangrove swamps on DLSCP are primarily dominated by black mangroves, although both red and white mangroves occur as well. Many of the mangrove systems are bordered by salt marsh on the waterward edge. Some areas, typically near US Hwy 1, continue to be invaded by Brazilian pepper, a topic addressed in later sections of this Plan.

Mangrove swamps often exist with no understory, although in some open areas species such as sea-oxeye daisy, marsh elder, saltwort (*Batis maritima*), and giant leatherfern (*Acrostichum danaeifolium*) may be found. Both conditions exist within DLSCP.

The biological importance of mangrove swamps is well documented as numerous marine and estuarine organisms depend on the swamps for a portion of their life cycle. The continuous shedding of mangrove leaves and other plant components also produce as much as 80 percent of the total organic material available in the aquatic food web. Mangrove swamps are considered one of the most productive forest systems in the world. Mangrove swamps provide important habitat for many rare and endangered flora and fauna and also functions as nursery grounds for many of Florida's commercially and recreationally important fish and shellfish.

Mangroves continue to face survival pressure resulting from oil spills, altered tidal flows, and changes in the quantity, quality, and timing of the fresh water input as a result of development of adjacent uplands. Mangrove swamps are sensitive to colonization by exotic species such as Brazilian pepper (*Schinus terebinthifolius*) and Australian pine (*Casuarina equisetifolia*). Both of the above species have been observed within the Preserve. Management of the mangrove swamps within the Preserve includes the removal of the above exotic species found within the existing mangrove swamps and excluding recreational access to the adjacent open waters through intact mangrove areas.

Rivers and Streams (Riverine)

12. Blackwater Stream

Blackwater Stream - Blackwater streams are flowing waters from their source to the downstream limits of tidal influence and bounded by channel banks.

The open water areas within the Preserve include the waters of Spruce Creek where they cross through property boundaries. There is also a creek on Martin's Dairy tract that is considered a small blackwater stream. These creek systems, due to proximity to the Ponce Inlet, provide extremely valuable habitat for commercial marine species that spend all or part of their life cycle in tidal creeks which include mullet (*Mugil* spp.), spot (*Leiostomus xanthurus*), blue crabs (*Callinectes sapidus*), oysters (*Crassostrea virginica*), and shrimp (*Penaeus* spp.). The smaller minnows and juvenile fish in the tidal creeks provide food for many recreationally important, predatory fish, such as tarpon (*Megalops atlanticus*), snook (*Centropomus undecimalis*), red drum (*Sciaenops ocellatus*), and spotted seatrout (*Cynoscion nebulosus*). In addition to these saltwater species, the creeks provide habitat for numerous common freshwater species as well.

Altered Landcover Types

13. Clearing

Clearing – Clearings are open habitats where vegetation has been removed or eliminated by various natural and unnatural activities.

A portion of the mesic pine flatwoods in the northeast portion of the Preserve on the Rose Bay tract was burned in a recent wildfire. The fire was extremely hot causing all the canopy trees along with the understory to die. As a safety precaution all the trees were removed. The area remains cleared with limited vegetation sprouting in the exposed shell and mineral soil. This area is proposed for wetland creation activities, in conjunction with a grant from the St. Johns River Water Management District.

14. Impoundment/Artificial Pond

Impoundment/Artificial Pond – Impoundments are generally described as areas of water retention or borrow pits.

Two impoundments occur within the Preserve. One is a large human made pond (approximately 35 acres) found on the eastern side of the Preserve. The pond is tidally influenced and appears to be shallow across. Ponds of this nature were created in the past as duck ponds for hunters to use during the duck migrations in the spring and fall. This pond may have also been created in combination with US1 for road fill. This impoundment has been largely colonized by mangrove and salt marsh vegetation. Because of the obvious human-induced shape, and the berm that surrounds it, the entire area has been classified as an impoundment. The open water connection to Murray Creek makes this a highly valuable habitat.

A smaller freshwater borrow pond is located on the western side of the Preserve. This pond was used as a dirt mine in the past for use as fill. The side slopes drop dramatically and only a small littoral shelf is present.

15. Improved Pasture

Improved pasture – Improved pasture is defined as an area dominated by planted non-native or domesticated native forage species and evidence of current or recent pasture activity and/or cultural treatments (mowing, grazing, burning, fertilizing). Improved pastures have been cleared of their native vegetation. Most improved pastures in Florida are planted with bahiagrass (*Paspalum notatum*) and to a lesser extent with Bermudagrass (*Cynodon dactylon*) or pangolagrass (*Digitaria eriantha*). Weedy native species are often common in improved pastures in Florida and include dogfennel (*Eupatorium capillifolium*), many species of flatsedge (*Cyperus* spp.), carpetgrasses (*Axonopus* spp.), crabgrasses (*Digitaria* spp.), and rustweed (*Polypremum procumbens*) among many others.

A small portion of improved pasture is included within the Preserve. This area consists of primarily bahiagrass (*Paspalum notatum*), although the species noted above do occur here as well. This area is used for public access including vehicular and equestrian trailer parking. This small portion of improved pasture is connected to a larger, square shaped pasture dominated by bahiagrass. A large pavilion is located just west of the state owned boundary. The parking area must be regularly monitored for use by gopher tortoises, especially for signs of any burrows.

16. Successional Hardwood Forest

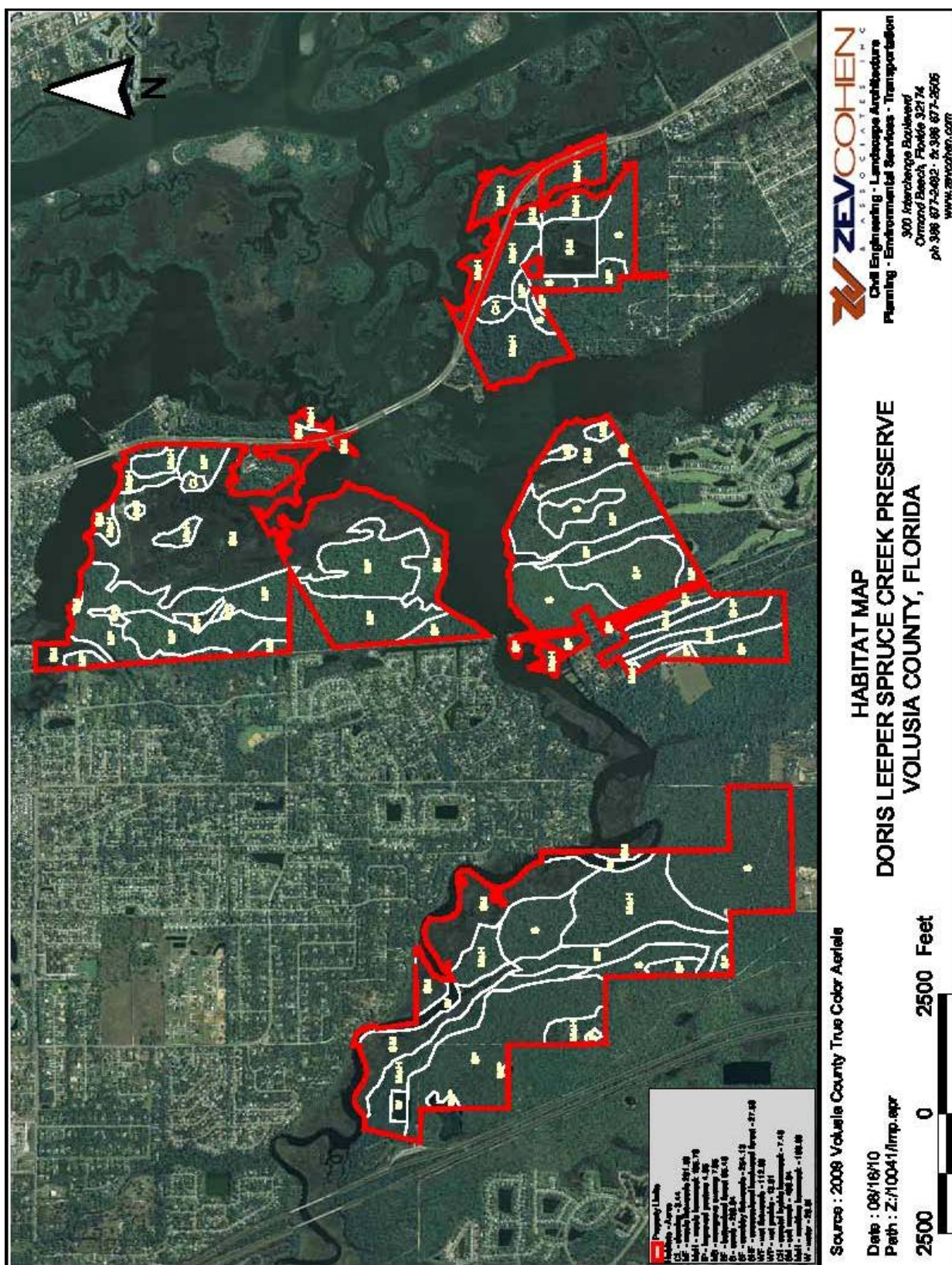
Successional Hardwood Forest – Successional hardwood forests are best described as closed-canopied forest dominated by fast growing hardwoods. These forests are either invaded natural habitat due to lengthy fire-suppression or old fields that have succeeded to forest. The subcanopy and shrub layers of these forests are often dense and dominated by smaller individuals of the canopy species.

This habitat is found along a canal which was historically draglined through a wetland hardwood forest. The existing vegetation consists of a canopy of laurel oak, slash and longleaf pine, cabbage palm, sugarberry, and southern magnolia. This community is expected to reach a climax community similar to the mesic hammocks described above, through natural succession.

17. Developed

Developed – Developed can be described in numerous ways but ultimately is defined as parking lots, buildings, maintained lawns (as part of recreational, business, or residential areas), campgrounds, recreational, industrial, and residential areas.

This habitat is found on the north end of the Bolt tract and consists of paved and gravel drives used for access to a single family private residence west of this habitat and to active recreational areas on the northern tip. The other recreational uses provided here include fishing from shore, mowed parking areas and picnic benches.



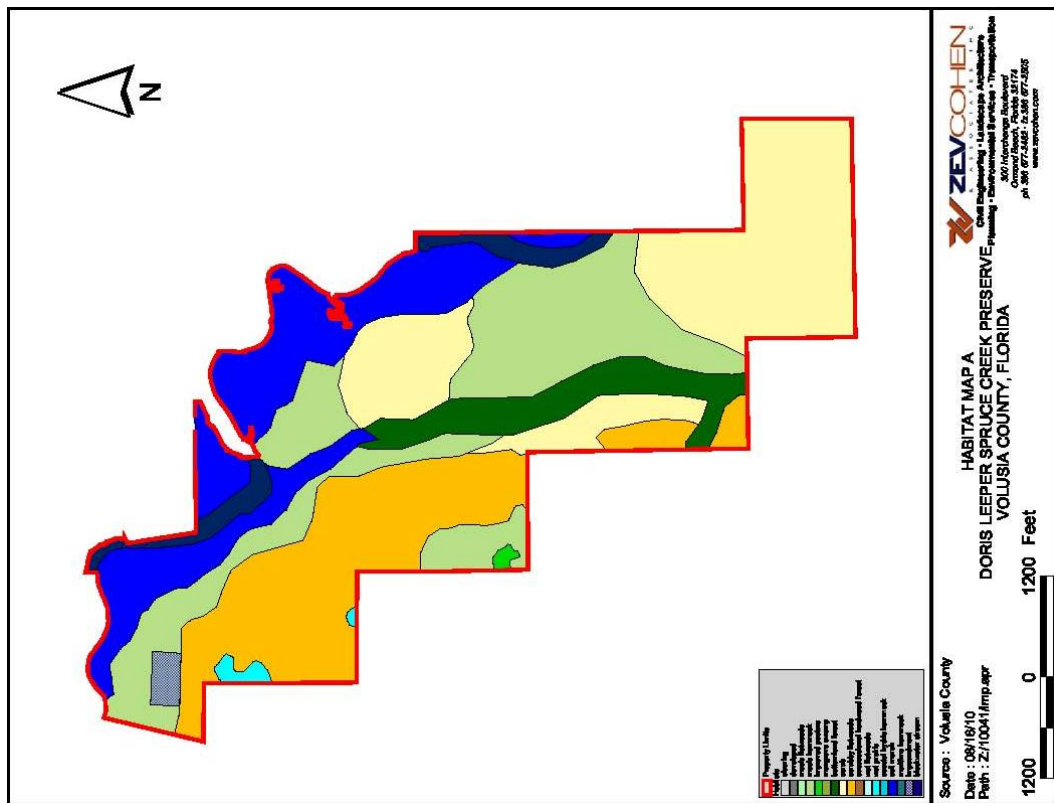


Figure 8.2a. Habitat Map A of Doris Leeper Spruce Creek Preserve.

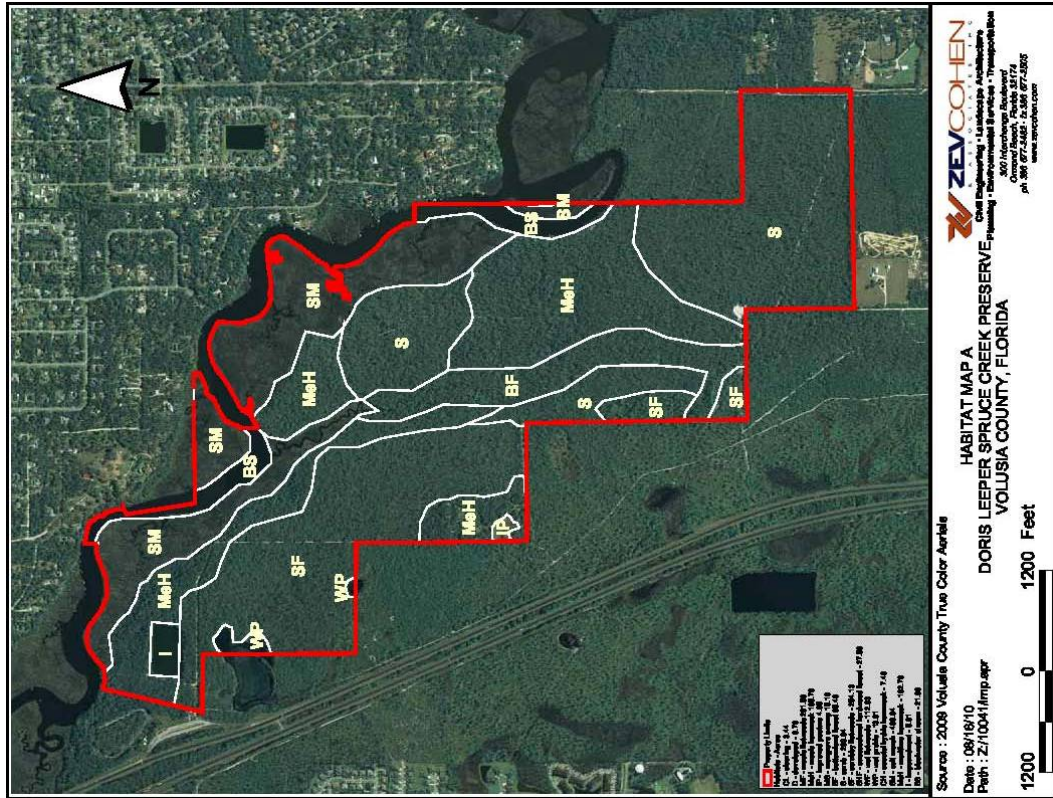
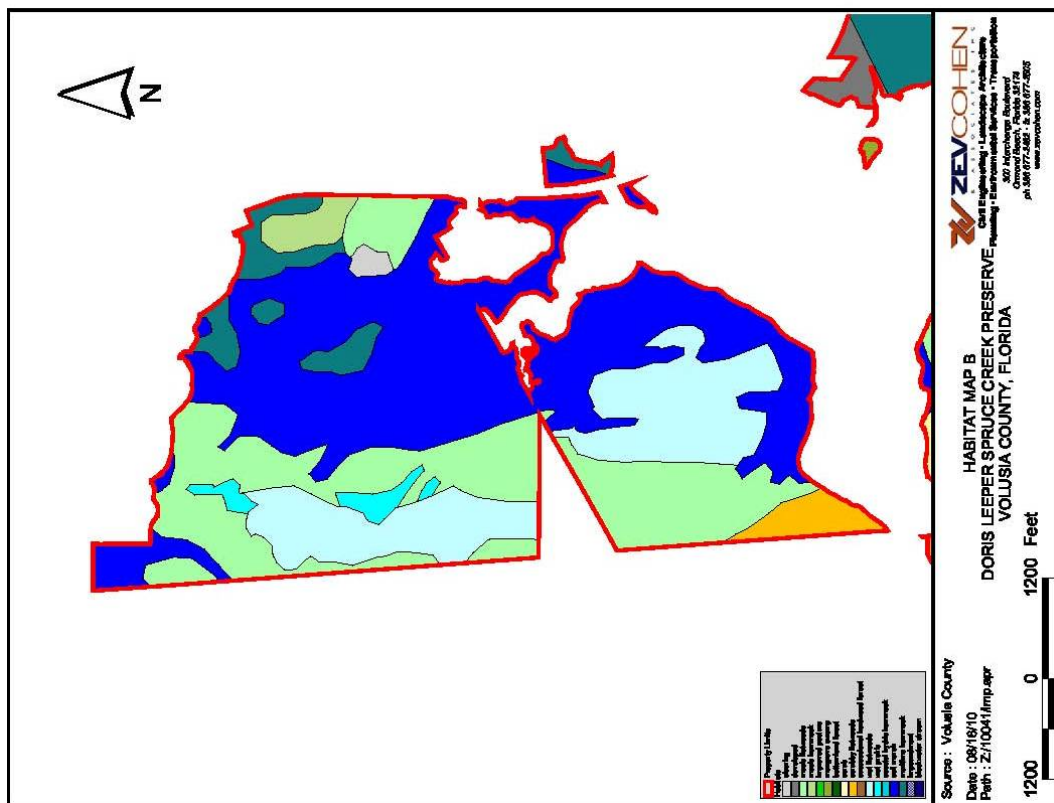


Figure 8.2b. Habitat Map A of Doris Leeper Spruce Creek Preserve over aerial.



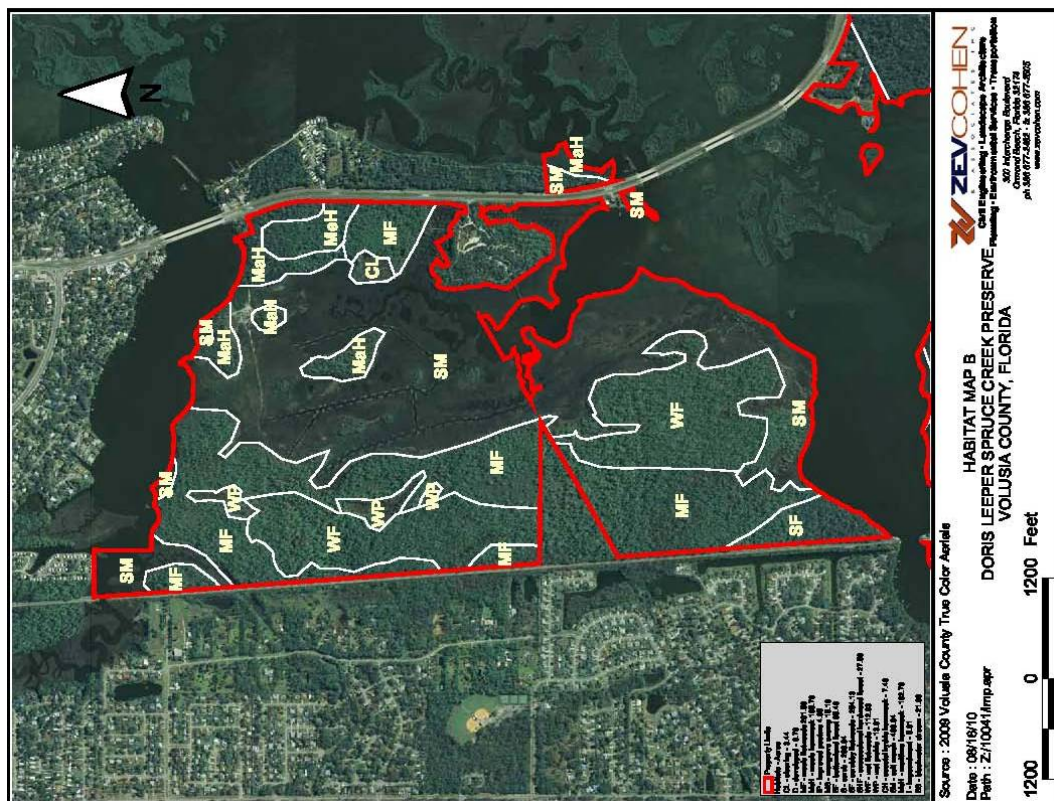
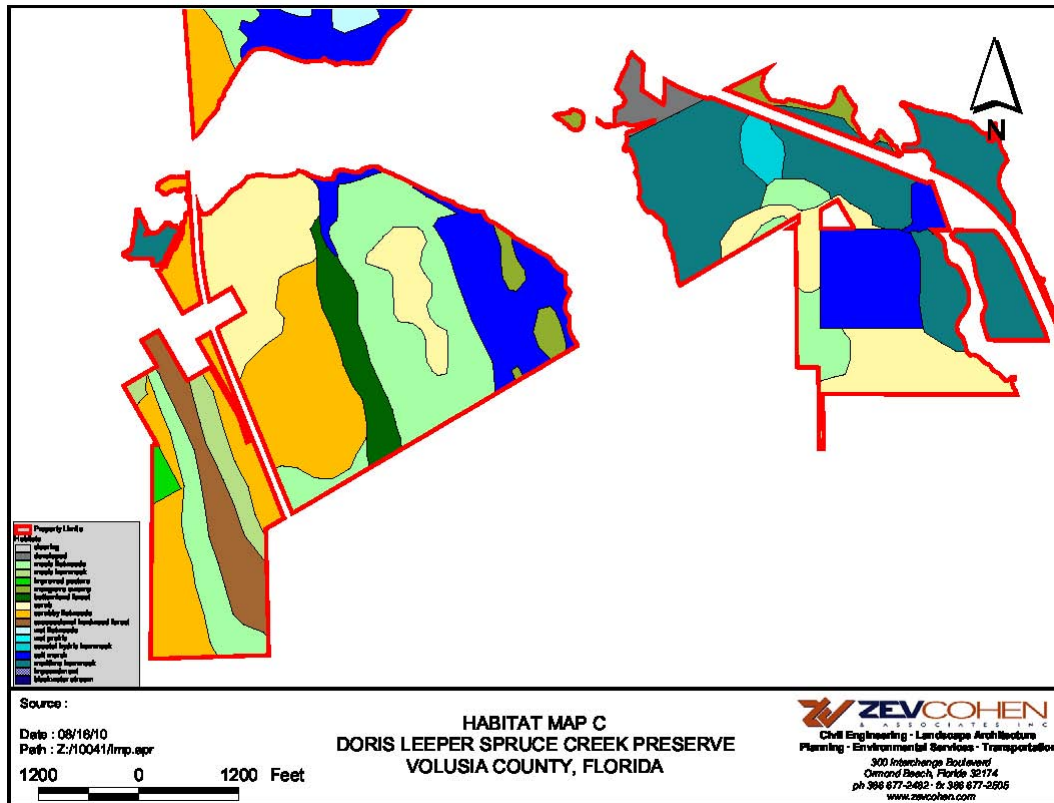
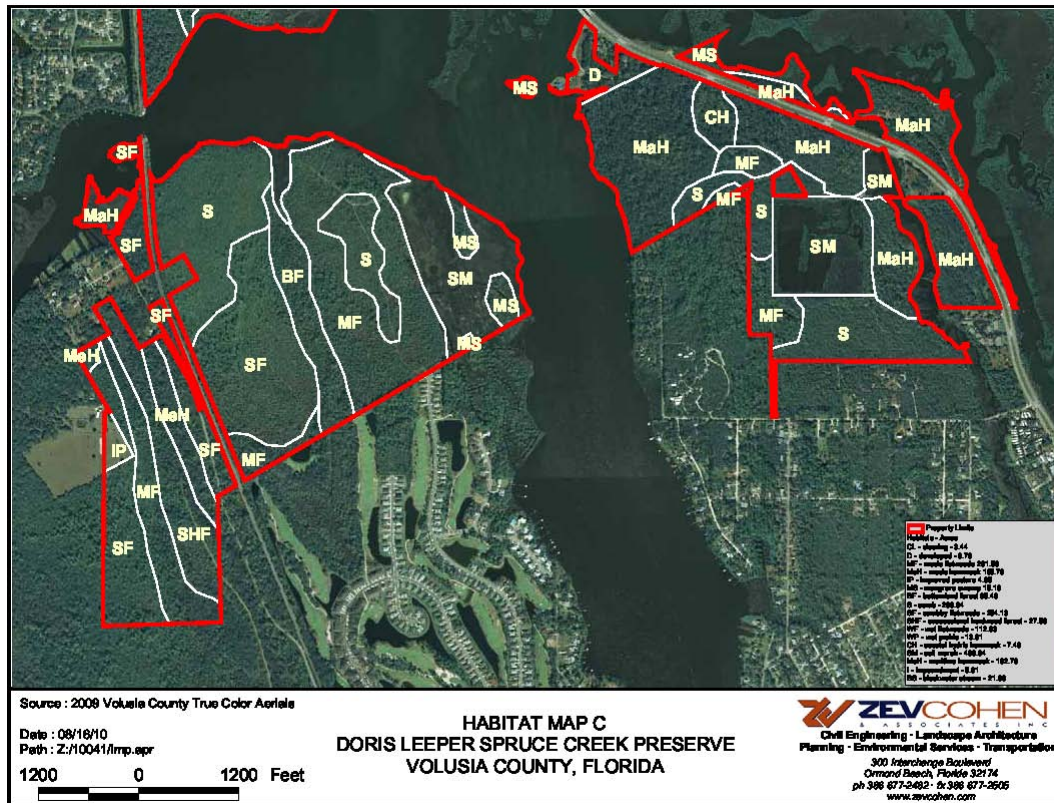


Figure 8.3b. Habitat Map B of Doris Leeper Spruce Creek Preserve over aerial.





C. Fish and Wildlife

Wildlife observations, both direct and indirect (indirect observations of their presence include remnants, tracks, burrows, calls, scat, etc.), are made by management staff during regular visit. The list provided in this section is comprised primarily of species observed during the course of the site investigations by ZCA and Volusia County staff and FNPS volunteers during the update of this Plan in 2010. Pedestrian transects were traversed along existing field trails, as well as along vegetational community boundaries. A list of species observed is provided in Table C.1. Table C.2 includes fish species as provided by the Legacy Program.

Table C.1 Wildlife species observed on the Doris Leeper Spruce Creek Preserve in Volusia County, Florida.

Taxa	Common Name	Scientific Name	Listed Species*
Reptiles/Amphibians			
	Eastern indigo snake	<i>Drymarchon corais couperi</i>	Yes
	Green anole	<i>Anolis carolinensis</i>	No
	Five-lined skink	<i>Eumeces fasciatus</i>	No
	Southern toad	<i>Anaxyrus terrestris</i>	No
	Green tree frog	<i>Hyla cinerea</i>	No
	Southern black racer	<i>Coluber constrictor priapus</i>	No
	Florida box turtle	<i>Terrapene carolina bauri</i>	No
	Gopher tortoise	<i>Gopherus polyphemus</i>	Yes
	Florida softshell turtle	<i>Apalone ferox</i>	No
	American alligator	<i>Alligator mississippiensis</i>	Yes
Birds			
	Anhinga	<i>Anhinga anhinga</i>	No
	Wood stork	<i>Mycteria americana</i>	Yes
	Brown pelican	<i>Pelecanus occidentalis</i>	Yes
	Osprey	<i>Pandion haliaetus</i>	Yes
	Roseate spoonbill	<i>Ajaia ajaja</i>	Yes
	Tricolored heron	<i>Egretta tricolor</i>	Yes
	White ibis	<i>Eudocimus albus</i>	Yes
	Cattle egret	<i>Bubulcus ibis</i>	No
	Great blue heron	<i>Ardea herodias</i>	No
	Great egret	<i>Ardea alba</i>	No
	Mottled duck	<i>Anas fulvigula</i>	No
	Belted kingfisher	<i>Ceryle alcyon</i>	No
	Ruby-throated hummingbird	<i>Archilochus colubris</i>	No
	Carolina chickadee	<i>Poecile carolinensis</i>	No
	Carolina wren	<i>Thryothorus ludovicianus</i>	No
	Grey catbird	<i>Dumetella carolinensis</i>	No
	Downy woodpecker	<i>Picoides pubescens</i>	No
	Pileated woodpecker	<i>Dryocopus pileatus</i>	No
	Red bellied woodpecker	<i>Melanerpes carolinus</i>	No
	Blue jay	<i>Cyanocitta cristata</i>	No
	Florida scrub-jay	<i>Aphelocoma coerulescens</i>	Yes
	Mockingbird	<i>Mimus polyglottos</i>	No
	Loggerhead shrike	<i>Lanius ludovicianus</i>	No
	Red-winged blackbird	<i>Agelaius phoeniceus</i>	No
	Eastern towhee	<i>Pipilo erythrophthalmus</i>	No
	Tufted titmouse	<i>Baeolophus bicolor</i>	No

	White-eyed vireo	<i>Vireo griseus</i>	No
	Brown thrasher	<i>Toxostoma rufum</i>	No
	Northern cardinal	<i>Cardinalis cardinalis</i>	No
	Common ground dove	<i>Columbina passerine</i>	No
	Mourning dove	<i>Zenaida macroura</i>	No
	Wild turkey	<i>Meleagris gallopavo</i>	No
	American crow	<i>Corvus brachyrhynchos</i>	No
	Boat-tailed grackle	<i>Quiscalus major</i>	No
	Black vulture	<i>Coragyps atratus</i>	No
	Red-shouldered hawk	<i>Buteo jamaicensis</i>	No
	Bald Eagle	<i>Haliaeetus leucocephalus</i>	Yes
Mammals	Nine-banded armadillo	<i>Dasypus novemcinctus</i>	No, non-native
	Southeastern pocket gopher	<i>Geomys pinetis</i>	No
	Raccoon	<i>Procyon lotor</i>	No
	Florida manatee	<i>Trichechus manatus</i>	Yes
	Bobcat	<i>Felis rufus</i>	No
	Grey squirrel	<i>Sciurus carolinensis</i>	No
	White-tailed deer	<i>Odocoileus virginianus</i>	No
	Feral hog	<i>Sus scrofa</i>	No, Exotic nuisance

*Refer to Section D below for details.

Feral hog is a common local nuisance species throughout the region. While acorns are their favorite food, they will eat almost anything, including dead animals. When natural foods are scarce or inaccessible, hogs will forage on tree seeds, seedlings, and herbaceous vegetation, causing significant damage in forests and marsh systems. In Florida and the Southeast, this may be a problem in regenerating long-leaf pine forests. In addition to the effects of consuming, knocking down and trampling large amounts of native vegetation, the rooting behavior of wild hogs causes significant damage. Rooting, digging for foods below the surface of the ground, destabilizes the soil surface, uprooting or weakening native vegetation, damaging systems and causing erosion. Wallowing destroys pond and stream banks, which may affect water quality.

Eradication efforts have been underway since management activities commenced. The hog population on the Preserve is fairly low, and they are not causing major harm in any known locations. Because hogs are prolific breeders, having up to 3 litters per year and due to the extent of forests, dense vegetation, and abundant water in the area, there is no way to completely eliminate them. Therefore, regular efforts to monitor and trap hogs continue, in a manner similar to that of monitoring and removal of exotic nuisance plant species.

The following list of species was provided by the County's Legacy Program (see Section IV for additional details on this educational program).

Table C.2 Fish survey results from Legacy Program, Volusia County Schools Environmental Education

ADOPT-AN-ESTUARY FISH SURVEY			
COMMON NAME	GROUP	COMMON NAME	GROUP
Bay Anchovy	Anchovies	Mosquitofish	Livebearers
Striped Anchovy	Anchovies	Sailfin Molly	Livebearers
Great Barracuda	Barracudas	Inshore Lizardfish	Lizardfish

Hairy Blenny	Blennies	Spanish Mackerel	Mackerel
Bluefish	Bluefish	Irish Pompano	Mojarra
Gafftopsail Catfish	Catfish	Silver Jenny	Mojarra
Hardhead Catfish	Catfish	Spotfinned Mojarra	Mojarra
Skillet Fish	Clingfishes	Striped Mojarra	Mojarra
Atlantic Cutlass fish	Cutlassfish	Striped Mullet	Mullet
Atlantic Croaker	Drum	White Mullet	Mullet
Black Drum	Drum	Atlantic Needlefish	Needlefish
Red Drum (Redfish)	Drum	Redfin Needlefish	Needlefish
Silver Perch	Drum	Lined Seahorse	Pipefish and Seahorses
Spot	Drum	Pipefish spp	Pipefish and Seahorses
Spotted Seatrout	Drum	Pinfish	Porgy
Star Drum	Drum	Sheepshead	Porgy
American Eel	Eels	Spottail Pinfish	Porgy
Planehead Filefish	Filefish	Checkered Puffer	Puffers
Bay Whiff	Flat Fish	Southern Puffer	Puffers
Blackcheek Tonguefish	Flat Fish	Striped Burrfish	Puffers
Gulf Flounder	Flat Fish	Atlantic Stingray	Ray
Hogchoker	Flat Fish	Smooth butterfly Ray	Ray
Southern Flounder	Flat Fish	Southern Stingray	Ray
COMMON NAME	GROUP	COMMON NAME	GROUP
Freshwater Goby	Goby	Bighead Searobin	Searobins
Frill Finned Goby	Goby	Atlantic Sharp Nose Shark	Shark
Goby spp	Goby	Bonnet Head Shark	Shark
Naked Goby	Goby	Lemon Shark	Shark
Black Sea Bass	Grouper	Atlantic Silverside	Silversides
Pigfish	Grunt	Lane Snapper	Snapper
Atlantic Menhaden	Herrings	Mangrove Snapper	Snapper
Atlantic Thread Herring	Herrings	Common Snook	Snook
Atlantic Bumper	Jack	Atlantic Spadefish	Spadefish
Crevalle Jack	Jack	Southern Stargazer	Stargazers
Florida Pompano	Jack	Ladyfish	Tarpon
Leather Jacket	Jack	Oyster Toadfish	Toadfish
Lookdown	Jack	Sea Grape	Tunicates and Sea Squirts
Permit	Jack	Sea Pork	Tunicates and Sea Squirts
Gulf Killifish	Killifish	Sea Squirt	Tunicates and Sea Squirts
Marsh Killifish	Killifish	Whiting spp	
Mummichog	Killifish		
Sheepshead Minnow	Killifish		
Striped Killifish	Killifish		

D. Listed Resources

A background literature search was conducted to compile a list of state and federally protected animal and plant species that could occur on-site. The four primary sources of literature reviewed include the Florida Fish and Wildlife Conservation Commission's (FWC) *Florida's Endangered Species, Threatened Species, And Species of Special Concern*, the United States Fish and Wildlife Service's (FWS) Threatened and Endangered Species System (TESS) database, the Florida Natural Areas Inventory (FNAI), and the Florida Department of Agriculture and Consumer Services (FDACS), Division of Plant Industry's (DPI) *Notes on Florida's Endangered and Threatened Plants*. During the site reconnaissance, observations or evidence of protected species and the likelihood of occurrence of each protected species were noted. Further review was completed following the habitat mapping and descriptions. The County is also working with the local chapter of the Florida Native Plant Society to increase the extant plant list, including review for observations and locations of protected plant species likely to occur within the Preserve.

In addition to the assessment conducted by the consultant, Florida Natural Areas Inventory was queried for a list of elemental occurrences on or near the Preserve. FNAI's provided their findings in a letter report which is provided in Appendix E.

1. Endangered, Threatened and Species of Special Concern

Listed Wildlife Species

The listed animal species with at least some likelihood of occurrence are listed in Table D.1.1, below. The estimated likelihood of occurrence of each species is noted in the table and those species with at least a moderate likelihood of occurrence are discussed following the table.

Table D.1.1: Listed animal species with the potential to occur on the Doris Leeper Spruce Creek Preserve in Volusia County, Florida.

Scientific Name	Common Name	FWC	FWS/NMFS	FNAI Rank	Likelihood of Occurrence
<i>Accipiter cooperii</i>	Cooper's hawk	N	N	G5/S3	High
<i>Aimophila aestivalis</i>	Bachman's Sparrow	N	N	G3/S3	Low
<i>Ajaia ajaja</i>	Roseate spoonbill	SSC	N	G5/S2	Observed
<i>Alligator mississippiensis</i>	American alligator	SSC	T(S/A)	G5/S4	Observed
<i>Aphelocoma coerulescens</i>	Florida scrub-jay	T	T	G2/S2	Observed
<i>Aramus guarana</i>	Limpkin	SSC	N	G5/S3	Moderate
<i>Ardea alba</i>	Great egret	N	N	G5/S4	Observed
<i>Buteo brachyurus</i>	Short-tailed hawk	N	N	G4/S1	Low
<i>Caretta caretta</i>	Atlantic loggerhead turtle	T	T	G3/S3	Low
<i>Charadrius melodus</i>	Piping plover	T	T	G3/S2	Moderate
<i>Chelonia mydas mydas</i>	Atlantic green turtle	E	E	G3/S2	Low
<i>Crotalus adamanteus</i>	Eastern diamondback rattlesnake	N	N	G4/S3	Observed
<i>Dendroica kirtlandii</i>	Kirtland's warbler	E	E	G1/S1	Low
<i>Dermochelys coriacea</i>	Leatherback turtle	E	E	G2/S2	Low
<i>Drymarchon corais couperi</i>	Eastern indigo snake	T	T	G3/S3	Observed

<i>Egretta caerulea</i>	Little blue heron	SSC	N	G5/S4	High
<i>Egretta rufescens</i>	Reddish egret	SSC	N	G4/S2	High
<i>Egretta thula</i>	Snowy egret	SSC	N	G5/S3	High
<i>Egretta tricolor</i>	Tricolored heron	SSC	N	G5/S4	Observed
<i>Elanoides forficatus</i>	Swallow-tailed kite	N	N	G5/S3	Observed
<i>Eretmochelys imbricata</i> <i>imbricata</i>	Atlantic hawksbill turtle	E	E	G3/S1	Low
<i>Eudocimus albus</i>	White ibis	SSC	N	G5/S4	Observed
<i>Falco columbarius</i>	Merlin	N	N	G5/S2	Moderate
<i>Falco peregrinus</i>	Peregrine falcon	N	N	G4/S2	Moderate
<i>Falco sparverius paulus</i>	Southeastern American kestrel	T	N	G5T4/S3	Moderate
<i>Gopherus polyphemus</i>	Gopher tortoise	T	N	G3/S3	Observed
<i>Grus canadensis pratensis</i>	Florida sandhill crane	T	N	G5T2/S2	Moderate
<i>Haematopus palliatus</i>	American oystercatcher	SSC	N	G5/S2	Moderate
<i>Haliaeetus leucocephalus</i>	Southern bald eagle	N	N	G5/S3	Observed
<i>Ixobrychus exilis</i>	Least bittern	N	N	G5/S4	Moderate
<i>Laterallus jamaicensis</i>	Black rail	N	N	G4/S2	Moderate
<i>Lampropeltis getula</i>	Common kingsnake	N	N	G5/S2	High
<i>Lepidochelys kemp</i>	Atlantic (Kemp's) ridley turtle	E	E	G1/S1	Low
<i>Lithobates capito</i>	Gopher frog	SSC	N	G3/S3	Moderate
<i>Mycteria americana</i>	Wood stork	E	E	G4/S2	Observed
<i>Nyctanassa violacea</i>	Yellow-crowned night- heron	N	N	G5/S3	High
<i>Nycticorax nycticorax</i>	Black-crowned night- heron	N	N	G5/S3	High
<i>Nerodia clarkii taeniata</i>	Atlantic salt marsh snake	T	T	G4T1/S1	High
<i>Pandion haliaetus</i>	Osprey	N	N	G5/S4	Observed
<i>Pelecanus occidentalis</i> <i>carolinensis</i>	Eastern brown pelican	SSC	N	G4/S3	Observed
<i>Peromyscus polionotus</i> <i>niveiventris</i>	Southeastern beach mouse	T	T	G5/T1	Low
<i>Picoides borealis</i>	Red-cockaded woodpecker	T	E	G3/S2	Low
<i>Picoides villosus</i>	Hairy woodpecker	N	N	G5/S3	Observed
<i>Pituophis melanoleucus</i> <i>mugitus</i>	Florida pine snake	SSC	N	G4T3/S3	Moderate
<i>Plegadis falcinellus</i>	Glossy Ibis	N	N	G5/S3	Moderate
<i>Podomys floridanus</i>	Florida mouse	SSC	N	G3/S3	High
<i>Rynchops niger</i>	Black skimmer	SSC	N	G5/S3	Moderate
<i>Sciurus niger shermani</i>	Sherman's fox squirrel	SSC	N	G5T3/S3	Low
<i>Sterna antillarum</i>	Least tern	T	N	G4/S3	Moderate
<i>Sterna caspia</i>	Caspian tern	N	N	G5/S2	Moderate
<i>Sterna maxima</i>	Royal tern	N	N	G5/S3	Moderate
<i>Sterna sandvicensis</i>	Sandwich tern	N	N	G5/S2	Moderate
<i>Trichechus manatus</i>	Florida manatee	E	E	G2/S2	Observed
<i>Ursus americanus</i> <i>floridanus</i>	Florida black bear	T	N	G2/S2	High
<i>Vireo altiloquus</i>	Black-whiskered vireo	N	N	G5/S3	Moderate

Abbreviations:

SSC: Species of Special Concern

T: Threatened

E: Endangered

N: Not Listed

FNAI Rank Definitions:

G1: Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.

G2: Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.

G3: Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.

G4: Apparently secure globally (may be rare in parts of range).

G5: Demonstrably secure globally

G#T#: Rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definition as above (e.g., G3T1).

S1: Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.

S2: Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.

S3: Either very rare and local in Florida (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.

S4: Apparently secure in Florida (may be rare in parts of range).

S5: Demonstrably secure in Florida.

Those species listed as having a moderate likelihood of occurrence or higher in Table D.1.1 are listed as such due to presence of suitable habitat. Based on the results of the database search described above, there were 44 possible listed animal species that have at least a moderate likelihood of occurrence. Several of these species were considered to have a moderate to high likelihood of occurrence and 16 have been observed by ZCA or County staff. The listed species that have at least a moderate likelihood of occurrence are discussed below and grouped into categories according to similar life histories.

The American alligator (*Alligator mississippiensis*) is listed as Threatened by the FWS and as a Species of Special Concern by the FWC. The American alligator was observed in the pond found in the northwest corner of the Preserve. American alligators are known to move into the brackish waters of tidally influenced creek systems for forage and also during the mating season. The habitat quality in the Preserve utilized by the American alligator is suitable and this species presents little management implications by its presence.

Gopher tortoise (*Gopherus polyphemus*) burrows were identified on the subject property. Multiple gopher tortoises were observed foraging on the subject property. The gopher tortoise, listed as Threatened by the FWC, is a key component in the determination of habitat suitability for other protected species because of the large number of other animals that will use tortoise burrows for one or more of their life requisites. The density of gopher tortoises within the Preserve in suitable habitat appears to be low and is likely due to fire suppression within the mesic flatwoods, scrubby flatwoods, and scrub habitats. Prescribed fire within the above habitats is essential to re-establish these as optimum gopher tortoise habitats. As described in Section IV, habitats that are too overgrown to successfully carry a safe fire, will be thinned mechanically. Any activity promoting thinning of woody vegetation, an increase in open space and herbaceous vegetation in the upland habitats will be critical to the long term population of gopher tortoises onsite.

The presence of the gopher frog (*Lithobates capito*), listed as a Species of Special Concern by FWC, is related to the presence of gopher tortoises for use of the burrows, however this species can also be found in stumpholes and tunnels in upland habitats. This species requires wetlands within

approximately one mile that are generally dry during some portion of the year. These conditions are present within the Preserve. The primary locations where these conditions exist include the Turnbull and Rose Bay tracts.

Four listed snake species has the potential to utilize the habitats found within the Preserve and two others have been observed within the Preserve. The Florida pine snake (*Pituophis melanoleucus mugitus*), listed as a Species of Special Concern by FWC, is known to occupy pine flatwoods and old fields. During low water conditions pine snakes seek open habitats with adjacent wetlands. The Florida pine snake is also a gopher tortoise commensal species and has been documented to utilize both tortoise burrows and the tunnels of southeastern pocket gophers, both of which occur in the Preserve.

The eastern indigo snake (*Drymarchon corais couperi*) is also a gopher tortoise commensal species and is listed as Threatened by the FWS and FWC. Indigo's have a broad range of habitats, from scrub and sandhill to wet prairies and mangrove swamps. In northern part of range, they often winter in gopher tortoise burrows in sandy uplands but forage in more hydric habitats. They require very large tracts to survive. This species has been observed on various tracts within the Preserve and up to six individuals were observed by County staff on the Turnbull tract.

The eastern diamondback rattlesnake (*Crotalus adamanteus*), which is not listed by FWC or FWS, but is ranked by FNAI, has been observed by County staff within the Preserve. The occurrence of this species is relatively common within coastal upland habitats such as those found on the Preserve.

The Atlantic salt marsh snake (*Nerodia clarkii taeniata*), which is listed as Threatened by FWS and FWC, is restricted to coastal Volusia County in its range. The Atlantic salt marsh snake is further restricted by habitat only being observed in estuarine habitats which include coastal salt marshes, mangrove swamps, tidal creeks, pools, and ditches. Protection of salt marshes, mangrove swamps, and tidal creeks and rivers of Volusia County, such as those found within the Preserve, from drainage, ditching, impoundment, and pollution are the most valuable forms of conservation for this species. The Preserve contains extensive amounts of high quality, suitable saltmarsh for this species. In addition, the County is working with other government agencies to remove existing mosquito ditching and conduct wetland restoration and enhancement projects where feasible. This activity and the maintenance of the saltmarsh habitat, especially through the continued control of exotic invasive species like Brazilian pepper (*Schinus terebinthifolius*) will continue to promote the long term likelihood of occurrence and success of this species.

While the listed sea turtle species have a low likelihood of occurrence within the Preserve, they are likely to utilize the open waters that dissect and are adjacent to the several tracts of the Preserve. The Atlantic loggerhead sea turtle (*Caretta caretta*) is listed as Threatened by both the FWS and the FWC. Atlantic green sea turtles (*Chelonia mydas mydas*) are listed as Endangered by both the FWS and the FWC. Juvenile loggerhead and green sea turtles are known to use the estuary systems of Florida for forage and protection from larger predators. The other listed sea turtle species are less likely to utilize these interior coastal waters, however, Atlantic hawksbill sea turtles (*Eretmochelys imbricata imbricata*) have been observed in the Intracoastal Waterway near inlets open to the Atlantic Ocean (namely Sebastian Inlet, about 90 miles south of Ponce Inlet). The nearest edge of the Preserve to the nearest open ocean inlet, Ponce Inlet, is about 3.7 miles. Continued management of

the Preserve to protect water quality and quantity and management of user groups are important elements to the protection of adjacent estuarine waters.

Several listed wading birds species utilize the saltmarsh and other wetland habitats onsite. Those known to be present and considered to have at least a moderate likelihood of occurrence on the Preserve are listed below and management goals of the property assumes their presence. .

The little blue heron (*Egretta caerulea*), snowy egret (*Egretta thula*), tricolored heron (*Egretta tricolor*), roseate spoonbill (*Ajaia ajaja*), great egret (*Ardea alba*), reddish egret (*Egretta rufescens*), glossy ibis (*Plegadis falcinellus*), least bittern (*Ixobrychus exilis*), limpkin (*Aramus guarana*), yellow-crowned night-heron (*Nyctanassa violacea*), black-crowned night-heron (*Nycticorax nycticorax*), and white ibis (*Eudocimus albus*) may utilize the impoundments, saltmarshes, and shoreline for foraging and potentially use the forested areas for roosting. No nesting rookeries are known to occur on the Preserve. Available rookery database information provided in the *Florida Atlas of Breeding Sites for Herons and Their Allies, Updated 1986 – 89* shows that there were no known rookeries in the area at the time of publication. The nearest known rookery occurs 3 miles north of the Preserve on a spoil island along the ICWW just south of the Dunlawton Avenue Bridge. The least bittern nests in marsh habitats, not in breeding rookeries as many of the other listed species.

Wood storks (*Mycteria americana*), listed as Endangered by FWS and FWC, were observed within the Preserve and wood storks have been observed routinely throughout the area. Wood storks forage mainly in shallow water in freshwater marshes, swamps, lagoons, ponds, tidal creeks, flooded pastures and ditches, where they are attracted to falling water levels that concentrate food sources (mainly fish). No wood stork nesting rookeries were observed or are listed by FWS within the Preserve. The Preserve is also not located within a FWS Core Foraging Area.

The black rail (*Laterallus jamaicensis*) is a ranked species by FNAI. The black rail is a secretive, year-round resident of marshes along much of the upper Gulf and Atlantic Coasts. They also winter in south Florida and migrants may be encountered statewide. The Preserve provides optimum habitat for the black rail within the salt marshes found on the property.

The American oystercatcher (*Haematopus palliatus*), black skimmer (*Rynchops niger*), piping plover (*Charadrius melodus*), least tern (*Sterna antillarum*), caspian tern (*Sterna caspia*), royal tern (*Sterna maxima*), and sandwich tern (*Sterna sandvicensis*) are each closely tied to coastal habitats. They nest on beaches and coastal islands and feed on small marine vertebrates and invertebrates.

The eastern brown pelican (*Pelecanus occidentalis carolinensis*), listed as a Species of Special Concern by FWC, utilizes the open waters adjacent to the Preserve. The preferred habitat of the brown pelican mainly consists of the coastal zone, feeding in shallow estuarine waters, and (less often) far offshore. Pelicans make extensive use of sand spits, sand bars, and islets for nocturnal roosting and daily loafing. They nest principally on small islands in bays and estuaries, in small bushes or trees, or on ground. Mangrove islands are used frequently for roosting and nesting in central and southern Florida. No eastern brown pelican rookeries were identified within the Preserve.

The implications of these listed bird species is in the management of saltmarshes, adjacent shorelines and wetland habitats in regards to protection and preservation, as discussed in detail in Section IV.

The Florida sandhill crane (*Grus canadensis pratensis*) has a moderate likelihood of occurrence at the Preserve. The Florida sandhill crane is listed as Threatened by the FWC. The Florida sandhill crane's preferred habitats are prairies, freshwater marshes, and pasture lands. They will frequent agricultural areas like feed lots and crop fields, and also golf courses and other open lawns, especially in winter and early spring. Nesting occurs in marshy depression ponds with herbaceous wetland vegetation. No Florida sandhill cranes or nests were observed during site visits to the Preserve. Preferred habitat is limited on the Preserve. This species has been observed nesting within one mile of the Preserve in suboptimal (cleared scrub) habitat. The limited presence of suitable habitat results in minimal implication for management strategies; however, the anomaly of nesting in scrub nearby requires regular observation for this species.

The bald eagle (*Haliaeetus leucocephalus*) has been removed from the FWC and FWS protected species lists, but is still listed by FNAI and is protected by the Bald and Golden Eagle Protection Act (BGEPA). Two active bald eagle nests are located within the Preserve and two are in close proximity. Bald eagle habitat most commonly includes areas close to coastal areas, bays, rivers, lakes, or other bodies of water that provide concentrations of food sources, including fish, waterfowl, and wading birds. They usually nest in tall trees, mostly live pines that provide clear views of the surrounding area. The nest located on the Turnbull tract is within a flatwoods community and has implication when proposing burning in this area. The nest on the Bolt tract is within maritime hammock where fire is not a proposed management tool.

The osprey (*Pandion haliaetus*) and swallow-tailed kite (*Elanoides forficatus*) are both ranked species by FNAI. The osprey was observed utilizing the open waters of the Preserve. No nests have been recorded within the Preserve. The swallow-tailed kite is a common migrant of the area and has been observed flying over the Preserve. No swallow-tailed kite nesting areas were observed during the site investigations.

The southeastern American kestrel (*Falco sparverius paulus*), listed as Threatened by the FWC, has a moderate potential to inhabit the Preserve. The southeastern American kestrel is normally found in open pine habitats, woodland edges, prairies, and pastures throughout much of Florida. Availability of suitable nesting sites is key during breeding season. Nest sites include tall dead trees or utility poles generally with an unobstructed view of surroundings. Sandhill habitats seem to be preferred, but may also occur in flatwoods settings. Open patches of grass or bare ground are needed in flatwoods settings, since thick palmettos prevent detection of prey. Although the species has not been observed, snags should be left standing where feasible.

The peregrine falcon (*Falco peregrinus*), short-tailed hawk (*Buteo brachyurus*), merlin (*Falco columbarius*), and Cooper's hawk (*Accipiter cooperii*), all ranked by FNAI, have a moderate potential to inhabit the Preserve. No particular management strategies are connected to the potential presence of these species.

The Florida scrub-jay (*Aphelocoma coerulescens coerulescens*), listed as Threatened by FWC and FWS, was observed within the Preserve at the southern border and occurrences have been documented on the Martin's Dairy Tract and to the south of the property. The Florida scrub-jay inhabits fire dominated, low-growing, oak scrub habitat found on well-drained sandy soils. They may persist in areas with sparser oaks or scrub areas that are overgrown, but at much lower densities

and with reduced survivorship. The mesic flatwoods, scrubby flatwoods, and scrub found within the Preserve provide the potential for valuable acreage which could be utilized by local scrub-jay families and offspring. Canopy and mid-story biomass reduction within the above habitats is essential to re-establish these areas as optimum Florida scrub-jay habitats. A discussion on the restoration of these habitats is presented in Sections IV and V below.

ZCA and Volusia County staff conducted a Florida scrub-jay survey in July 2010 in accordance with guidelines provided by the FWS North Florida Field Office, in their document, *Scrub-Jay Survey Guidelines*, which was adapted from Fitzpatrick *et. al.*, (1991). The one scrub-jay observed flew from south of the property to the southern boundary to respond to a voice recording. It then flew back offsite and did not return. No scrub-jays were documented throughout the remainder of the Preserve during the five-day survey.

The Florida black bear (*Ursus americanus floridanus*), which is listed as Threatened by FWC, is known to inhabit the area. The Florida black bear uses a wide variety of forested communities which is necessary to support the varied seasonal diet of black bears. Forested wetlands are particularly important for diurnal cover and the ecotone along the creek within Martin's Dairy provides a corridor for movement through the area.

The Sherman's fox squirrel (*Sciurus niger shermani*), listed as a Species of Special Concern by FWC, is the largest of the three fox squirrels that occur in Florida. The Sherman's fox squirrel utilizes xeric habitats such as long-leaf pine and turkey oak sandhills, although they can be found in mesic forests as well. No fox squirrels have been observed onsite due to a lack of suitable habitat.

The Florida manatee (*Trichechus manatus latirostris*), listed as Endangered by FWC and FWS, is an aquatic mammal that utilizes the adjacent brackish habitats of the Preserve. The manatee winters in warm springs and other warm water outfalls along the central and southern Florida coasts. Manatees also are known to traverse the shallow waters of the ocean along our entire coastline. Management strategies as listed for the sea turtles above apply to this management of this species.

Listed Plant Species

The listed plant species with some potential to occur on the subject property are listed in Table D.1.2, below.

Table D.1.2: Listed plant species with the potential to occur on the Doris Leeper Spruce Creek Preserve in Volusia County, Florida.

Scientific Name	Common Name	FDACS	FWS	FNAI Rank	Likelihood of Occurrence
<i>Acrostichum danaeifolium</i>	Giant leather fern	CE	N	N	Observed
<i>Asplenium dentatum</i>	American toothed spleenwort	E	N	G5/S1S2	Low
<i>Asplenium erosum</i>	Auricled spleenwort	E	N	G5/S2	Low
<i>Asplenium serratum</i>	Bird's-nest spleenwort	E	N	G4/S1	Low
<i>Calamintha ashei</i>	Ashe's savory	T	N	G3/S3	Low
<i>Calamovilfa curtissii</i>	Curtiss' reedgrass	T	N	G3/S3	Low
<i>Calopogon barbatus</i>	Bearded grass pink	T	N	N	Low

<i>Calopogon multiflorus</i>	Many-flowered grass pink	E	N	G2G3/S2S3	Low
<i>Campyloneurum phyllitidis</i>	Strap fern	E	N	N	Low
<i>Centrosema arenicola</i>	Sand butterfly pea	E	N	G2/S2	Moderate
<i>Chamaesyce cumulicola</i>	Sand dune spurge	E	N	G2/S2	Moderate
<i>Conradina grandiflora</i>	Large-flowered rosemary	E	N	G3/S3	High
<i>Deeringothamnus rugelii</i>	Rugel's pawpaw	E	E	G1/S1	Low
<i>Encyclia tampensis</i>	Butterfly orchid	CE	N	N	High
<i>Epidendrum conopseum</i>	Greenfly orchid	CE	N	N	High
<i>Garberia heterophylla</i>	Garberia	T	N	N	High
<i>Glandularia maritima</i>	Coastal vervain	E	N	G3/S3	Moderate
<i>Glandularia tampensis</i>	Tampa vervain	E	N	G2/S2	Moderate
<i>Harrisella porrecta</i>	Threadroot orchid	T	N	N	Low
<i>Hartwrightia floridana</i>	Florida hartwrightia	T	N	G2/S2	Low
<i>Helianthus carnosus</i>	Lakeside sunflower	E	N	G1G2/S1S2	Low
<i>Hexalectris spicata</i>	Crested coralroot	E	N	N	Low
<i>Illicium parviflorum</i>	Yellow star anise	E	N	G2/S2	Low
<i>Lechea cernua</i>	Nodding pinweed	T	N	G3/S3	Moderate
<i>Lechea divaricata</i>	Spreading pinweed; pine pinweed	E	N	G2/S2	Moderate
<i>Lilium catesbaei</i>	Catesby's lily	T	N	N	Moderate
<i>Listera australis</i>	Southern twayblade	T	N	N	Low
<i>Lycopodiella cernua</i>	Nodding clubmoss	CE	N	N	Low
<i>Matelea floridana</i>	Florida milkweed; panhandle anglepod	E	N	G2/S2	Moderate
<i>Monotropsis reynoldsiae</i>	Pigmy-pipes; sweet pinesap	E	N	G1Q/S2	Low
<i>Myrcianthes fragrans</i>	Simpson's ironwood; Simpson's stopper	T	N	N	High
<i>Nemastylis floridana</i>	Fall-flowering ixia; celestial lily	E	N	G2/S2	Moderate
<i>Nolina atopocarpa</i>	Florida beargrass	T	N	G3/S3	Observed by FNAI
<i>Ophioglossum palmatum</i>	Hand adder's tongue fern	E	N	G4/S2	Low
<i>Osmunda cinnamomea</i>	Cinnamon fern	CE	N	N	Observed
<i>Osmunda regalis</i>	Royal fern	CE	N	N	Observed
<i>Opuntia stricta</i>	Shellmound pricklypear	T	N	G2/S2	High
<i>Pecluma dispersa</i>	Polypody fern	T	N	G5/S2	Low
<i>Pecluma plumula</i>	Polypody fern	E	N	G5/S2	Low
<i>Pecluma ptilodon</i>	Swamp plume polypody	E	N	G5/S2	Low
<i>Peperomia humilis</i>	Terrestrial peperomia; pepper	E	N	G5/S2	Low
<i>Pinguicula caerulea</i>	Blue butterwort	T	N	N	Low
<i>Platanthera blephariglottis</i>	Large white fringed orchid	T	N	N	Low
<i>Platanthera cristata</i>	Golden fringed orchid	T	N	N	Low
<i>Platanthera flava</i>	Southern tubercled orchid; gypsy-spikes	T	N	N	Low
<i>Platanthera nivea</i>	Snowy orchid; bog torch	T	N	N	Low
<i>Pogonia ophioglossoides</i>	Rose pogonia	T	N	N	Low

<i>Pteroglossaspis ecristata</i>	Wild coco; giant orchid	T	N	G2G3/S2	Moderate
<i>Rhapidophyllum hystrix</i>	Needle palm	CE	N	N	Moderate
<i>Rhododendron canescens</i>	Pink azalea	CE	N	N	Low
<i>Sarracenia minor</i>	Hooded pitcherplant	T	N	N	Moderate
<i>Scaevola plumieri</i>	Inkberry	T	N	N	Low
<i>Schwalbaea americana</i>	American chaffseed	E	E	G2G3/S1	Low
<i>Spiranthes brevilabris</i> var. <i>floridana</i>	Florida ladies' tresses	E	N	G1/S1	Low
<i>Spiranthes laciniata</i>	Lace-lip ladies' tresses	T	N	N	Low
<i>Tillandsia utriculata</i>	Giant wild pine	E	N	N	Low
<i>Zamia pumila</i>	Florida coontie	CE	N	N	Observed
<i>Zephyranthes atamasca</i> var. <i>treatiae</i>	Treat's rain lily	T	N	N	Low
<i>Zephyranthes simpsonii</i>	Simpson's zephyr lily	T	N	G2G3/S2S3	Low

Abbreviations:

CE: Commercially Exploited

T: Threatened

E: Endangered

N: Not Listed

FNAI Rank Definitions:

G1: Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.

G2: Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.

G3: Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.

G4: Apparently secure globally (may be rare in parts of range).

G5: Demonstrably secure globally

G#T#: Rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definition as above (e.g., G3T1).

S1: Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.

S2: Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.

S3: Either very rare and local in Florida (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.

S4: Apparently secure in Florida (may be rare in parts of range).

S5: Demonstrably secure in Florida.

The large expanses of xeric uplands that occur in the Preserve make it a potential site for numerous listed plant species. Much of the upland areas on the project site have been fire-suppressed for many years, leading to a closed canopy structure and overgrown conditions. Several listed plant species may occur within the scrub and scrubby flatwoods, such as the large-flowered rosemary (*Conradina grandiflora*), garberia (*Gaberia heterophylla*), pinweeds (*Lechea cernua* and *L. divaricata*), sand butterfly pea (*Centrosema arenicola*), sand dune spurge (*Chamaesyce cumulicola*), wild coco (giant orchid - *Pteroglossaspis ecristata*) and shellmound pricklypear (*Opuntia stricta*) are species that are likely to occur in the xeric habitats following disturbance (such as fire or clearing) and along existing breaks such as trails and powerlines. Florida beargrass (*Nolina atopocarpa*) was sighted by FNAI staff in 2004 in a general location west of the blackwater creek on Martin's Dairy tract. This location is not within state-owned lands, however similar scrubby habitat does exist within state owned land boundaries. This species, like the others discussed, becomes crowded out of the xeric community as shrubs take over following prolonged periods without fire or other disturbances. The implication of the potential presence of these species is related to user group management and xeric habitat restoration and implementation of fuel reduction and open space creation efforts.

Commercially exploited species, such as Giant leather fern (*Acrostichum danaeifolium*), royal fern (*Osmunda regalis*), cinnamon fern (*Osmunda cinnamomea*), needle palm (*Rhapidophyllum hystrix*), greenfly orchid (*Epidendrum conopseum*), butterfly orchid (*Encyclia tampensis*) and coontie (*Zamia pumila*) have either been observed or have high potential for occurrence on the property. These species, especially the latter three, have a high threat for collection. They are relatively conspicuous in the environment and easily harvested. As the site is bordered by navigable waterways, public and private roads and properties, the implication for management is again tied to user groups. This includes managing access points and internal trail networks that do not call attention or lead to easily accessible areas where these species are present, especially in abundance.

Several species are common in the county, in high acid wet flatwoods, but will occur along borders of any of the wetlands on the Preserve. These include Catesby's lily (*Lilium catesbaei*), hooded pitcher plant (*Sarracenia minor*), and fall-flowering ixia (*Nemastylis floridana*). Managing the wet flatwoods for open mid-story and shrub layers, including reducing and preventing woody thickets are successful measures in managing for these species.

The presence of aboriginal shell mounds on the site may also harbor listed plant species such as the reddish peperomia (*Peperomia humilis*), brittle maidenhair fern (*Adiantum tenerum*), and shell mound prickly-pear (*Opuntia stricta*), although many of these species are still considered to have a low likelihood of occurrence. Preservation efforts to limit foot-traffic and the introduction of fire would benefit plant species that occur on shell mounds. In addition, when the archaeological sites are monitored by County staff, a biologist should accompany the visits where possible to review for the presence of these species.

Continued preservation efforts that protect onsite hammocks is beneficial to several listed species including Simpson's stopper (*Myrcianthes fragrans*), Florida milkweed (*Matelea floridana*), several of the above CE listed species and species still considered to have a low likelihood of occurrence including hand fern (*Ophioglossum palmatum*), widespread polypody (*Pecluma dispersa*), and plume polypody (*Pecluma plumula*). The polypody ferns are known to occur in similarly situated hammocks in Flagler County, but require live oaks larger in diameter than those observed on DLSCP.

The occurrence or potential occurrence of listed plant and wildlife species does not directly preclude public use of this site. The presence of listed species provides environmental education opportunities for the general public. However, user group management is an important component of these species continued existence or restoration efforts. Several species occur in habitats in need of restoration efforts. Where and when feasible, surveys for listed species will occur following management activities, including any land clearing or fires (prescribed or otherwise). These surveys may be conducted by County staff or coordinated with local volunteer groups such as the FNPS.

2. Imperiled Natural Communities

Three (3) natural communities on the Preserve are listed by FNAI as Imperiled Natural Communities. Maritime hammock, scrub, and scrubby flatwoods each are considered imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor. The Preserve includes 162.8 acres of maritime hammock, 280.0 acres of scrub, and 254.1 acres of scrubby flatwoods. As described previously within the Section B the maritime hammock within the Preserve is functioning at an optimum level.

Management activities include protection from illegal access related to dumping and off-road vehicle (ORV) use and prevention of invasion by invasive exotic species. The scrub and scrubby flatwoods require restorative land management activities to allow them to function as required to host the flora and fauna species which historically reside within the community.

E. Archaeological and Historic Resources

Archaeological resources located within the Preserve are remnants of two significant occupations—the native people who used the extensive waterways for transportation and sustenance and the British Period Andrew Turnbull “New Smyrna” settlement (1766—1777). There are no historic structures located within the Preserve.

Spruce Creek Mound (8V099) is listed on the National Register of Historic Places. The prehistoric earthen mound is the largest in East Central Florida. The mound was used as a ceremonial, social, and political center for the Timucuan and their predecessors that inhabited the lower Spruce Creek basin. The site was still being used when Europeans arrived in the early 1500’s. Interpretation of this resource along with the other lesser mounds and shell middens scattered through the surrounding areas is a key component to the educational programs proposed for the Preserve.

Sleepy Hollow (8V07142) was included in the National Register of Historic Places in 2008, one of multiple properties associated with the archaeological resources of the Eighteenth Century Smyrna Settlement of Dr. Andrew Turnbull. The site is depicted in a 1767 map as being occupied by William Watson, a carpenter contracted by Turnbull to construct settlement facilities prior to the arrival of Turnbull’s party of indentured servants.

There are 15 recorded sites on state lands, and there are 18 recorded sites on adjacent conservation lands. The vast majority of these sites are new sites recorded by registered public archaeologists retained by local governments with field investigations and reports completed in 1986, 1989, 1990, 1996, 1997, 1999 and 2006. These studies have systematically addressed areas of most probable resources. For management purposes, the entire preserve is considered to be archaeologically sensitive and investigation is undertaken prior to any site disturbance or recreational uses with potential for ground disturbance.

To protect these resources, it is the County’s policy not to provide the general public with information regarding location of these sites, with the exception of the Spruce Creek Mound Complex, where an interpretive kiosk is planned. Protection of these identified cultural resources is a key management objective for the Preserve.

III. USAGE OF THE PROPERTY

A. Previous Use and Development

The first European permanent occupation was related to Andrew Turnbull's New Smyrna Settlement during the British Colonial Period of Florida's history (1763-1777). During the second Spanish period, portions of the project site and vicinity were awarded to numerous individuals in the form of land grants. However, development in the vicinity of the site stagnated with the event of the Seminole wars and the Civil War. The project site and neighboring lands were not intensely developed or utilized until the turn of the 20th century.

A portion of the project site, located on the southern and northern shores of Strickland Bay, was subdivided and eventually timbered by the Nordman Land and Timber Company. The preferred timber was cypress and pine. Effects of the early timbering activities are evident due to the age of the overstory trees on the project site. The Nordman Company also raised cattle on the project site. Intensified free-range cattle operations became more prominent in the early 20th Century and were the main activities on the project site until the late 1970s.

Since the property has been in public ownership by the State of Florida and Volusia County, it has been used by residents for passive and active recreation activities. One of the adjacent properties owned by the County is developed as a recreation area, Spruce Creek Preserve, with camping, hiking, fishing and picnicking opportunities. Multiple use, unpaved trails have been developed on the western portion of the Preserve. In addition, portions of the Preserve, specifically Spruce Creek, are listed in Florida's Greenways and Trails by the Florida Department of Transportation. The remainder of the Preserve has minimal public access.

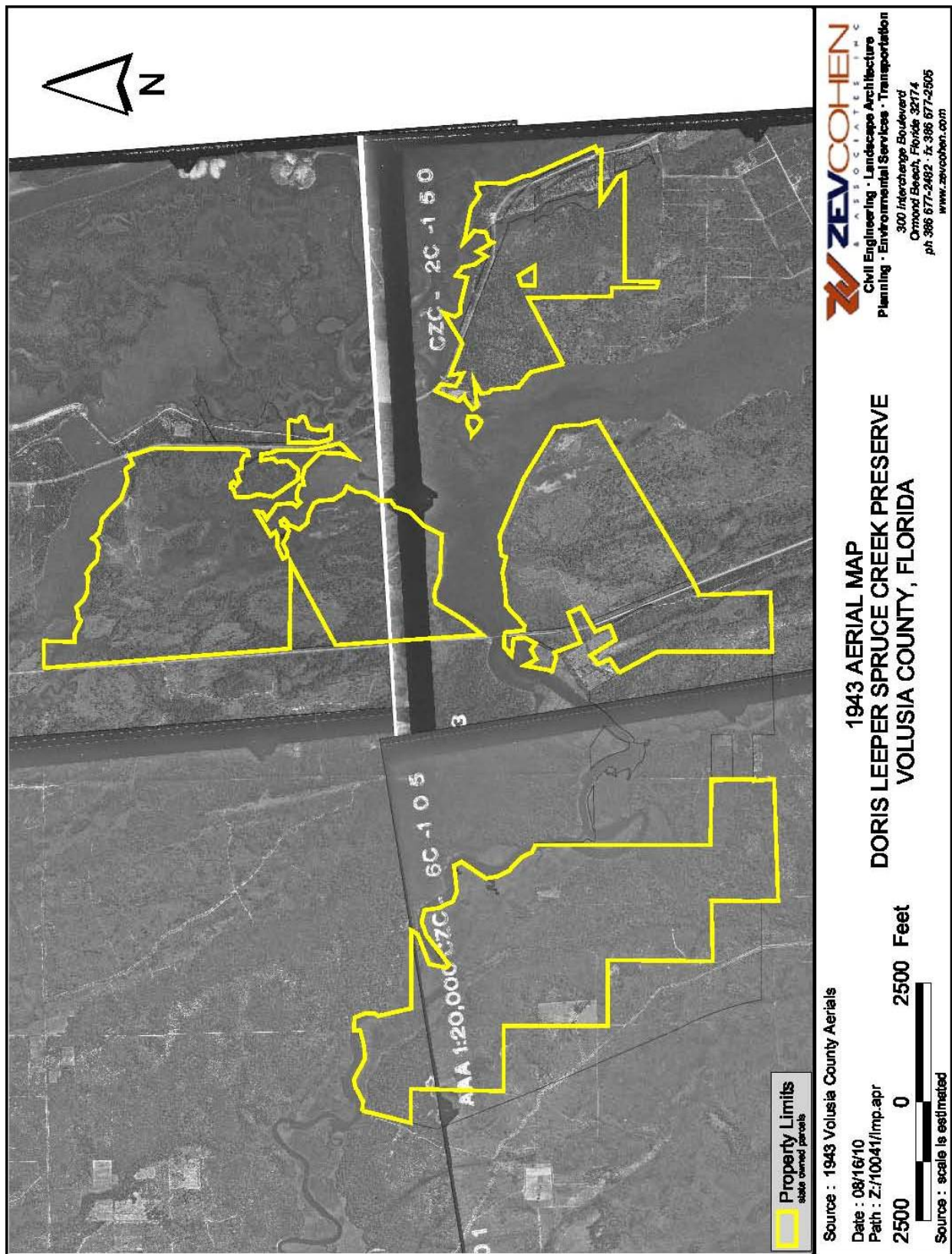


Figure 9. 1943 Aerial Map of Doris Leeper Spruce Creek Preserve of State.

B. Current Use and Development

Current uses at the Preserve are primarily related to public access and outdoor recreation. Public access is provided to all tracts and is supported by adjacent parcels within the Preserve. The following table depicts uses and infrastructure that exist within or adjacent to each tract.

Table 1. Inventory of Doris Leeper Spruce Creek Preserve recreational and access facilities, February, 2011.					
Current Use / Infrastructure	Tract				
	Martin's Dairy	Turnbull	Bolt	Sleepy Hollow	Rose Bay
Access Point	1	1	1	1	2, 1*
Parking	1		1	1	1*
Access Gate	1	2	4	1	2, 1*
Information Kiosk	1				3*
Trails**(H,B,E,V)***	H B E V	H B E V	H B V	H V	H B
Pavilion	1****			1	1, 1*
Boardwalk					1
Observation Tower					1
Camp Sites (Special use – permit required)					17*
Fishing Access			2	1	1*
Canoe/Kayak Landing/ Launch					1*
Picnic Area					24*
Playground					1*
Restroom					2*
Historic Site Open to Public	1				

*Located on adjacent Spruce Creek Park for Rose Bay;

**The 5 tracts contain approximately 84 miles of public and restricted use trails

***H,B,E,V = Hiking, Biking, Equestrian, Vehicle. Vehicle trails are for staff and approved use only. Sleepy Hollow has a paved road (former US 1) and grass parking. Equestrian use on Turnbull is for the west portion only

****Located on adjacent public land between Turnbull and Martin's Dairy Tracts

The tracts with gated access are generally open during daylight hours. Primitive group camping is allowed with a permit from the County. Vehicular parking is provided for all tracts except Turnbull, and Rose Bay is provided for via the adjacent Spruce Creek Campground. Refer to the Recreation Plan for details on locations of existing infrastructure and uses.

C. Purposes for Acquisition of the Property

The acquisition of DLSCP was begun in the mid-1980's, and involved several individuals, conservancy groups, and state and local governments and agencies. The Preserve was purchased through a joint effort with Volusia County and the State's Conservation and Recreation Lands (CARL) Program. The purpose of the acquisition through the CARL program was the protection, conservation and management of natural and cultural resources along while providing for public access and recreation.

D. Assessment of the Impact of Planned Use

Determination of public uses that are consistent with acquisition purposes followed the parameters outlined below. The parameters are a summary of the objectives and goals for management of the Preserve as they relate to purpose for acquisitions under the CARL program.

1. To conserve and protect environmentally unique and irreplaceable lands that contain native, relatively unaltered flora and fauna representing a natural area unique to, or scarce within, a region of Florida or a larger geographic area, including FNAI listed imperiled habitats;
2. To conserve and protect native species habitats that support or could support with appropriate management techniques state and federally listed species or species considered imperiled by FNAI;
3. To conserve, protect, manage, or restore important ecosystems, landscapes, and forests, if the protection and conservation of such lands are necessary to enhance or protect significant surface water, ground water, coastal, recreational, timber, or fish or wildlife resources which cannot otherwise be accomplished through local and state regulatory programs.
4. To provide areas, including recreational trails, for natural resource based recreation and other outdoor recreation on any part of any site compatible with conservation purposes.

The primary goal here is to provide a diversity of outdoor recreational opportunities that are environmentally, culturally, outdoor or educationally oriented where such activities do not adversely impact the long-term well-being of the natural and cultural resources for which the property was acquired or for which it is being managed. Public needs and desires, as well as assessment of the impact of planned activities on natural and cultural resources, are considered in the development of recreational opportunities and represent "balanced public utilization." Uses planned for the Doris Leeper Spruce Creek Preserve are in compliance with the Conceptual State Lands Management Plan.

E. Acreage that Should be Declared Surplus

The County evaluated all state-owned parcels identified within this plan to determine if any of the parcels include lands that are not being used for the purpose for which they were originally leased. It was determined that all lands within DLSCP are being managed and utilized for the primary purpose of protection and conservation of natural resources and allow for public access and outdoor recreation and education where compatible with the primary purpose. Thus, no portion of DLSCP should be considered or declared surplus.

Note that the acreage adjustments that occurred in the updated Optimal Boundary did not include reduction of *owned* property. All State-owned properties have remained as such, and none are declared as surplus at this time.

F. Proposed Single or Multiple-Use Potential

DLSCP will be managed under the multiple-use concept. The Preserve will allow for natural resource-based recreation and educational opportunities, while keeping protection of the natural and historical resources found in the area as the primary goal and objective.

G. Analysis of Multiple-Use Potential

It is Volusia County's goal to manage the property in such a way as to protect the site's natural and historical resources, while also providing opportunities for compatible, resource-based recreation and education. During the planning process, all potential outdoor recreation uses were considered. Those found appropriate are discussed within this plan. Exceptions are evaluated on a case-by-case basis for compatibility with the Preserve's outdoor recreation and resource preservation purposes.

The potential of generating revenue to fund management was also analyzed. Some revenues may be generated by user and concession fees at different recreation sites adjacent to the Preserve. Use of portions of the area as mitigation for development elsewhere may also yield revenues. Finally, revenues may be generated through sale of forest products generated during management. Any revenues generated through the sale of these timber products will be used for future management of the property.

The use of private land managers to facilitate restoration and management of this unit was also analyzed. Decisions regarding this type of management (such as mitigation projects, removal of timber for resource protection or restoration, etc.) will be made on case-by-case bases as necessity dictates.

Table F.1: Summary of activities and uses that were analyzed for compliance with the goals and objectives of the DLSCP Management Plan.

Activity	Status of Use*		
	Approved	Conditional	Rejected
Protection of listed species	✓		
Ecosystem maintenance	✓		
Soil and water conservation	✓		
Hunting			✓
Fishing		✓	
Wildlife Observation	✓		
Hiking		✓	
Bicycling		✓	
Equestrian use		✓	
Mining			✓
Silviculture (timber harvesting)		✓	
Cattle grazing / range management			✓

Primitive Camping		✓	
Canoe / kayak landings		✓	
Ecotourism		✓	
New Linear Facilities		✓	
Off Road Vehicle Use			✓
Survey and Mapping	✓		
Environmental Education	✓		
Citriculture or other agriculture / row crops			✓
Cultivation of native species for seed banks or propagation		✓	
Preservation of cultural sites	✓		
Preservation of historical sites	✓		
Apiaries		✓	
Vehicular Access and Parking		✓	

Approved = A use considered to be in compliance with goals and objectives with the Plan.

Conditional = A use that is considered in compliance with Plan goals and objectives given certain conditions are met (e.g., timing, location of use, intensity, etc.)

Rejected = A use considered not in compliance with goals and objectives of the Plan.
(added per direction to define status of use terms)

The majority of uses and decisions on acceptability are clear. Those worth further discussion are explained in further detail here. It is important to note that the list is primarily geared towards user groups; however, activities performed by the lead agency may appear contradictory and thus are discussed below.

Ecosystem maintenance includes any of the management activities noted in Section IV below. Note that some activities may result in soil surface disturbance. These activities will be analyzed on a case by case basis, and will consider alternative methods, goals being met that require the activity and presence within the Preserve in regards to known or potential cultural resources. Another ecosystem maintenance activity includes the eradication of nuisance wildlife species (namely feral hog) by trapping, followed by discharge of a firearm. This activity should not be considered hunting, and is performed by County staff or licensed trappers contracted by the County. Another activity involved in ecosystem maintenance includes access to all parts of the Preserve by management equipment, including off road vehicles. The rejection of this use is again applied to public user groups.

Silviculture is applied in the context of sustainable forestry management and its identification as an approved use is solely as a support mechanism to natural resource restoration and management and maintenance. The identification of this practice ensure the ability of the lead agency to properly conduct timber harvests, prescribed burns and other activities regularly associated with silviculture that often require such a label to obtain approvals by local municipalities and other regulatory agencies. The purpose here is not for revenue generation, but revenue occurring as a result of activities is encouraged to assist in funding of restoration and management activities.

Hiking, equestrian use and biking are limited to use on trails and are currently allowed in designated areas on the Preserve with equestrian use and biking primarily limited to the Martin's Dairy tract. These are on-going and popular activities and result in the greatest daily use of the Preserve. These activities have been designated as a Conditional Use as these are active uses and do result in some impacts to natural resources and historical sites. They are controlled by trail and access management.

These activities occasionally conflict with the primary goals of the Preserve as a result of the creation of new trails by the user groups. This has been the biggest challenge in management of these activities. The presence of a resident caretaker on the adjacent lands within the Preserve and the management of user groups and access points by the Volusia County Parks, Recreation and Culture Division will greatly enhance the presence of the County onsite and is expected to be sufficient to continue to allow these activities on the Preserve.

Linear facilities, including gas and power lines, already occur within the limits of the Preserve and were in place prior to acquisition. The approval of this use is limited to existing linear projects.

The Recreation Plan, provided in Appendix K, discusses the implementation of these uses, and provides for guidance of public use management in the context of the two prong approach to natural resource protection and public access.

H. Cooperating Agencies Responsibilities

No other agencies are directed by the lease or other agreements as a cooperating partner in the management of DLSCP. A list of agencies that have participated in achieving the goals within this Plan follows:

Florida Communities Trust – Land Acquisition
Florida Division of Forestry – Prescribed and Wildfire Control Assistance
The Legacy Program – Education, Environmental Monitoring, Resource Inventory
St. Johns River Water Management District – Land Acquisition; Salt marsh restoration
City of Port Orange – Land Acquisition; Future Land Use Planning/ Development Encroachment
City of New Smyrna Beach – Future Land Use Planning/ Development Encroachment
Florida Natural Areas Inventory – Natural Resource Inventory – (Rare, Listed Species)
Volusia County Mosquito Control – Invasive / nuisance species control
Florida Fish and Wildlife Conservation Commission – Eagle Nest Monitoring; Hunting Analysis
Division of Historical Resources – Historical and Archaeological Inventory / Database
SE Volusia Historical Society – Historical and Cultural Resource Programs
Florida Public Archaeology Network – Historical and Cultural Resource Programs
Atlantic Center for the Arts – Education; Public Meetings
Florida Native Plant Society – Floral Lists

IV. MANAGEMENT GOALS AND OBJECTIVES

Volusia County has implemented resource and user group management programs for the purpose of preserving the significant natural and cultural resources under its directive as lead agency. The goals and objectives have been developed for DLSCP to meet the purpose for which the property was acquired. The specific goals and objectives to meet that purpose are the culmination of goals and objectives developed cooperatively by County, user groups, and other stakeholders. Target dates for completion of objectives are classified as short-term (within the next two years) or long-term (up to ten years from plan date to implementation). Successful completion of each of these objectives is contingent upon adequate funding.

The Resource Management Objectives for Doris Leeper Spruce Creek Preserve were identified as the following:

- Preserve and protect the expansive freshwater marsh wetland system and water resources on-site;
- Maintain and restore the ecological integrity of existing upland vegetative communities through sound innovative management practices in order to provide for a more healthy & productive ecosystem;
- Implement a prescribed burn program;
- Continue exotic species removal and maintenance program;
- Protect, manage and restore areas for the listed wildlife species that may occur on-site. This includes:
 - Protection and maintenance of existing wetland and upland habitats,
 - Selective restoration of scrub habitat and flatwoods,
 - Protect identified and high potential historical and archeological resources,
- Continue to monitor and protect property, environmental, historical and archaeological resources;
- Maintain use of existing facilities;
- Continue recreational nature based programs and infrastructure
- Continue environmental educational programs and infrastructure

A. Habitat Restoration and Improvement

Goal: Restore / improve native habitats trending away from optimal conditions

Objective: Implement Techniques to Trend Towards Desired Future Conditions / Habitat Maintenance Condition

Many of the natural communities on the Preserve have not burned for many years, resulting in dense canopies and/or subcanopies. Areas with a dense canopy or subcanopy provide minimal habitat for listed plant and/or animal species due to increased shade, decreased availability for space, decreased herbaceous vegetation in the groundcover stratum, and decreased open patches. In xeric habitats, this also may lead to decreased return intervals for fire, with eventual evolution to xeric hammocks. Many of the extant habitats would benefit from periodic removal of the dense canopy and/or subcanopy of pines, oaks and other common shrub strata species through prescribed fire or manual removal. This reverses the conditions noted above and with fire can return nutrients to the soil and create favorable conditions for listed species. Many wildlife species, including listed species, would benefit from the reduction of oak canopy through the increase of herbaceous forage and open habitat conditions.

Prescribed fire in the appropriate habitats is an important abiotic factor in the restoration and improvement of many habitats. Other abiotic factors affecting habitat quality include hydrologic preservation and protection, and infrastructure management to protect habitats from potential multiple-use impacts.

Important biotic factors in the restoration and improvement of extant habitats include control of invasive exotic species and sustainable forestry resource management. Each of these are discussed below as specific goals.

Objectives:

- Develop a Habitat Restoration Plan
- Implement Restoration Plan where applicable
- Implement Fire Management Plan
- Implement Timber Assessment / Timber Plan

Land management and restoration require clear ecological goals with Desired Future Conditions (DFCs). The DFCs shall be included in the Habitat Restoration Plan that is to be developed. Establishing these goals is essential to successful ecosystem management and restoration. It is essential to provide a clear vision of future conditions that can be communicated to the management staff and the public, establish a guide for conservation and management actions, establish priorities for proposed activities, and integrate proper monitoring criteria that can evaluate resource management. Specific to the Preserve, there are 17 identified vegetative communities with numerous protected wildlife and plant species that require land management activities to function at peak ecological levels.

Measurable Parameters (may be extended beyond those listed here):

- List of acreages by habitat requiring specific restoration treatment techniques
- Identify parameters that define Desired Future Conditions (per habitat)
- Acres receiving fire surrogate treatments (by habitat and year)
- Acres burned (incl. wild and prescribed fires, with follow up assessment)
- Post-burn (immediate and 1-4 mos.) analysis
 - Fire intensity
 - Crown scorch / canopy mortality
 - Duff / soil litter consumed
- Acres / board feet harvested per tract per habitat
- Estimate of total pre and post Basal Areas per tract

B. Fire Management

Goal: Return fire to appropriate habitats in DLSCP

Objective: Implement the Prescribed Burn Plan

There are numerous benefits to implementing a prescribed fire management program for the Preserve. The following statements summarize the general benefits of a properly developed and implemented prescribed fire program:

- Reduce fuel hazards;
- Improve accessibility for fire fighters, public and wildlife mitigation;
- Control competing vegetation, forest diseases and insects in order to provide for a more healthy and productive forest;
- Improve forage for wildlife;

- Remove dead materials and return nutrients to soils;
- Improve aesthetics by increasing new understory and overstory forest growth.

Fire is a historically important disturbance within several plant communities and can be very important for reproduction and production of species endemic to the vegetation communities found on the project site. Average fire return intervals of 2-8 years (depending upon hydrologic setting) were common historically within the flatwoods communities. Scrub habitat historically underwent fire return intervals ranging from 8—20 years. Variability of the fire return intervals, extent of areas burned, and seasonality, duration and intensity of burns within burn management units are important aspects included in the burn prescription plan to maintain diversity and promote “patchiness” within habitats. A burn zone map is included in the Prescribed Burn Plan in Appendix G.

The ultimate goal in a typical burning program is to allow for growing season burns to occur within the fire-dependent communities and to reach a stage where fire is being utilized as a habitat maintenance tool, rather than a restoration tool.

Many of the areas on the project site do not require management by fire, including the mesic hammocks, mangrove areas, salt marsh, and bottomland hardwood communities on the property. Although some areas, such as the salt marshes and the ecotones adjacent to the mesic hammocks, may benefit from periodic prescribed burns, other concerns including access constraints and muck fires would limit the viability of prescribed fire for these areas.

Several communities on the Preserve are overgrown and require significant biomass reduction. The most critical occurrence of this is within the scrub communities, especially those on the Martin’s Dairy tract. The scrub oak and other shrub species have reached a height and caliper than they have created a closed canopy. The structure of the scrub is inappropriate at this time, including height and density of the canopy/ subcanopy, lack of open ground space, and reduction in herbaceous vegetation in the ground stratum.

Several constraints exist that influence how and when prescribed fire can be implemented. These constraints are discussed in Section V, below. The constraints surrounding prescribed burning at DLSCP are numerous and significant. Prescribed burning may prove to be unfeasible or impracticable, either temporally, spatially, or logistically for portions of the Preserve. Where / when these circumstances occur, other management options will be considered. One management strategy would be to conduct hand removal and/or mechanical removal of the canopy to reduce the coverage of xeric oaks and pines. Other management strategies including roller chopping and forestry mowing reduce competition in the shrub and groundcover strata. Several methods are available as fire surrogates, but none have proven to be as ecologically effective as fire. However, many of these fire surrogate activities are necessary prior to safe fire implementation. In these cases, mechanical and other fire surrogate activities are crucial in the eventual re-introduction of fire.

There are several listed species whose occurrence and population health are directly related to fire / fire surrogate activities. Where the specifics of a particular species are well known, they are discussed in the imperiled species section below.

Objectives:

- Implement Fire Management Plan

Measurable Parameters (may be extended beyond those listed here):

- List of acreages suitable for fire implementation (or surrogate) by habitat / tract
- Acres receiving fire surrogate treatments (by habitat and year)
- Acres burned (incl. wild and prescribed fires, with follow up assessment)
- Post-burn (immediate and 1-4 mos.) analysis
 - Fire intensity
 - Crown scorch / canopy mortality
 - Duff / soil litter consumed
- Dominance of shrub layer pre and post treatment per treatment unit
- Canopy extent (by percent) pre and post treatment per treatment unit

C. Hydrological Preservation and Restoration

Goal: Protect water quality and quantity, restore hydrology to the extent feasible, and maintain the restored condition.

Spruce Creek is designated as a Class III and an Outstanding Florida Water (OFW). This designation restricts development in certain areas of the adjacent uplands; includes some areas as Riparian Habitat Protection Zone under state regulation (Section 11.5.4, ERP Applicant's Handbook). Management activities on the property such as burning and mechanical treatments would be compatible with the OFW designation and would not decrease water quality. However, care must be taken to not create a potential erosion problem along a topographic gradient where siltation into the adjacent water could occur. Recreational uses such as fishing, canoeing, and trail use are compatible with this designation. Again, special care must be used in placement of trails, especially equestrian and bike trails, to avoid potential erosion issues along topographic changes that could result in silt or sediment discharges to Spruce Creek or other adjacent waters. No direct discharge into Spruce Creek will be allowed from any development on the project site. Canoe landings would be considered an allowed activity and would not result in water quality degradation, but would require permitting through state and federal agencies.

The condition of the wetlands adjacent to Spruce Creek and its tributaries and salt marshes around the area will be evaluated prior to any development (canoe landings, trail creation/ relocation, etc.) on the project site. Existing or historic field road crossings through wetland areas should be evaluated to determine if they should be removed or retrofitted with culverts for use in the trail system of the project to restore natural water movement within impacted wetland areas. In areas that the trail system is proposed to cross over wetland areas, consideration will be given to placing the alignment over the retrofitted road crossings and/or using boardwalks.

There are several mosquito ditches present in the salt marsh areas. The modification of mosquito control ditches and the removal of associated spoil piles could be used to restore portions of the salt marsh areas adjacent to Turnbull and Strickland Bays. This would include filling and replanting these small ditches to either high or low salt marsh depending on the situation. This activity is being actively pursued on and adjacent to the Preserve and the St. Johns River Water Management District

has been an active partner in these activities. Funding for this restoration is primarily expected to come from outside agencies, such as SJRWMD.

Objectives:

- Prioritize hydrologic restoration needs in relation to other restoration goals and threat to health of the overall natural community and/or imperiled species
- Implement hydrological restoration projects where feasible / necessary
- Inventory / monitor trails and infrastructure and manage trails to avoid erosion problems
- Consider boardwalks or similar for wetland / water crossings or access (canoe/ kayak launch, etc.)

Measurable Parameters (may be extended beyond those listed here):

- List of acreages of wetland habitats onsite
- Identification by habitat / acreage of areas requiring restoration vs. protection
- Acres of mosquito ditching filled / to-be-filled (per year basis, per entire Preserve – must identify acreage with BOT lands)
- Linear measurement of trails requiring relocation / relocated (per year basis, per entire Preserve – must identify acreage with BOT lands)
- Number / linear measurement of boardwalks proposed / existing (per year basis, per entire Preserve – must identify acreage with BOT lands)

D. Sustainable Forest Management

Goal: Manage timber resources for resource conservation and habitat restoration, enhancement, and maintenance through a stewardship ethic that embraces sustainable forest management practices.

DLSCP has multiple forested habitats. The ability to use sustainable forestry management practices to assist in habitat management is an invaluable tool. The timber stands that exist on DLSCP have been assessed. This assessment and the resulting timber management plan are provided in Appendix H.

Objectives:

- Implement the Timber Assessment / Timber Plan

Measurable Parameters (may be extended beyond those listed here):

- List of acreages by habitat requiring specific restoration treatment techniques
- Acres receiving fire surrogate treatments (by habitat and year)
- Acres burned (incl. wild and prescribed fires, with follow up assessment)
- Post-burn (immediate and 1-4 mos.) analysis
 - Crown scorch / canopy mortality
- Acres / board feet harvested per tract per habitat
- Estimate of total pre and post Basal Areas per tract
- Revenue per annum generated / spent / applied to

E. Exotic and Invasive Species Maintenance and Control

Goal: Remove exotic and invasive plants and animals to the maximum extent practicable and conduct ongoing maintenance as needed.

Some of the more invasive, exotic plants that occur on the project site include Australian pine (*Casuarina equisetifolia*), cogongrass (*Imperata cylindrica*), and Brazilian pepper (*Schinus terebinthifolius*). Except for Brazilian pepper, all invasive exotic species occur at low levels (<5% of any given habitat) while Brazilian pepper continues to exist at about 5% of the salt marsh habitat. Cogongrass is only known to occur in two isolated spots, both of which are less than 0.1 acres in size and have been treated and are monitored for resprouts. One is on Bolt Tract and the other is not on state-owned lands, but occurs along the I-95 ROW on the west side of the Port Orange parcel.

Because of these species invasive nature and potential to disrupt natural communities by dominating native wetland and/or upland communities, these plants are targeted for removal using chemical and/or mechanical control methods. As populations of these plants are found, regular maintenance events are scheduled to eliminate or reduce these particular exotic species. Where feasible, volunteer organizations can be used to monitor the preserve for invasive and exotic species and could perform some of the control of these species in cooperation with regularly scheduled maintenance events.

Because of the location of the preserve along a major water area, the opportunistic nature of terrestrial species to spread via human use and the known natural history of the exotic species in the area, it is a reality that invasive and exotic species will continue to invade the shorelines, salt marshes, and all habitats. Those areas easily accessed such as shorelines, property boundaries marked by clearing or fencing, field roads, trails and natural breaks are the most likely to be invaded by such species and will be regularly monitored for any invasive species. The species of primary importance during monitoring include species listed as Level I or II invasive exotics by the Florida Exotic Pest Plant Council (FLEPPC or EPPC). Monitoring will consist of visual reconnaissance during all other onsite activities. Discovery of new species or locations will be recorded by species, location and size of infestation and regularly monitored until eradicated or in a maintenance level condition.

Of the invasive exotic animal species, feral hogs (*Sus scrofa*) create the greatest visible impact to the onsite natural communities and create large disturbed areas that disrupt natural vegetative processes and promote the introduction of invasive / weedy species. The hog population is relatively low at this time and impacts from this species are minor. Numerous other exotic animals may be present, from terrestrial to aquatic. Species such as Cuban tree frog (*Osteopilus septentrionalis*) are outcompeting local native treefrogs. However, these smaller, more inconspicuous species are not readily or easily controlled through land management practices. Education of such species, including proper disposal, may be a potential tool to assist in identification and control of less visible species.

The County has developed an Arthropod Control Plan to evaluate the necessity of control. This is provided in Appendix K.

Objectives:

- Continue to inventory and control invasive exotic plant and animal species

- Conduct inventories for exotic plant species following habitat disturbances
- Remove known invasive, exotic species utilizing appropriate measures
- Practices to control exotic and invasive species will be designed and conducted in such a manner as to minimize the impacts upon native plant and animal species.

Measurable Parameters (may be extended beyond those listed here):

- List of invasive species by location and treatment required
- Estimate of existing invasive plant species (by percentage)
- Estimate of area treated per year per area
- List / amount of chemical or other treatments applied
- Number of hogs trapped / removed per year

F. Imperiled Species Habitat Maintenance, Enhancement, Restoration or Population Restoration

Goal: Maintain, improve, or restore listed and imperiled species populations and habitats.

Doris Leeper Spruce Creek Preserve supports numerous listed wildlife and plant species. Where a particular species occurrence has an implication to resource management, it is discussed below. Those that occur due to existence of high quality habitat, or that are benefited by existing proposed management goals and objectives, are not discussed specifically in this section.

Proper management of the project site for listed wildlife and plant species is based on locations of known populations (extant or otherwise) on the property. Therefore, inventory to determine presence / absence of species with specific management objectives is necessary. Surveys will be focused in areas that have the highest likelihood of occurrence for listed species, based on habitat requirements of the species, and should follow events creating disturbances within the communities, including controlled (roller chopping, prescribed fires) and uncontrolled (wildfires, tornadoes) events.

The density of gopher tortoises (*Gopherus polyphemus*) within the Preserve appears to be low. It appears that this species is lower than carrying capacities set by the Florida Fish and Wildlife Conservation Commission (FWC) in determining whether a site would be a suitable recipient site for tortoises relocated from to-be-developed lands. The County does not currently offer mitigation for this species or other natural resources to outside private interests. However, the use of DLSCP as a tortoise-recipient site can be a source of revenue, and can be utilized by other County development projects that may occur within occupied tortoise habitat. Therefore, tortoise relocation to DLSCP is identified as suitable management tool, but is not a mandated objective by this Plan. As noted elsewhere, vegetation reduction, preferably through prescribed fire is essential to increase suitability of gopher tortoise habitats and therefore increase density and total population, which meets the goal stated above. Those habitats that are too overgrown to successfully carry a safe fire will be thinned mechanically. Any activity promoting thinning of woody vegetation and thereby an increase in open space and herbaceous vegetation in the upland habitats will be critical to the stated goal for this species.

Cox *et. al.* stated that fire used as a management tool on gopher tortoise habitat is more beneficial than other techniques because it reduces the amount of ground litter, quickly reduces nutrients bound

in plant materials, and does not disturb soil conditions and wildlife to the same extent as other management techniques. Furthermore, there is strong evidence to suggest that burning, particularly during the growing season, has several other beneficial effects on gopher tortoise populations. Prescribed burning during this period reduces the growth of deciduous shrubs and trees, thereby reducing canopy cover and stimulating herbaceous ground cover. Fire during this period also removes dead litter and tall standing plant stems at a time when hatchling tortoises are first ready to disperse from their nests and establish their first burrows. Summer burns expose mineral soil which may be necessary for burrow excavation by hatchlings. Since this species is adapted to upland plant communities in which fire is a natural and recurring feature, it is reasonable to assume applying a “natural” fire regime with respect to frequency and season will result in a habitat matrix suited to the needs of this species.

The presence of highly visible, listed snake species, the eastern indigo snake (*Drymarchon corais couperi*) and the eastern diamondback rattlesnake (*Crotalus adamanteus*), has implications to user group management as much as natural resource management. The natural resource management goals and objectives listed elsewhere in this section will meet the goal established for imperiled species within this subsection. However, user groups should be made aware of these species presence for their own safety as well as for that of the species. Identification of the species and notification that they are protected by law, and an important part of the ecosystem should be a major point of education as it relates to these species. This education can be accomplished through kiosks, brochures, and/ or internet resources made available to user groups. Warnings against the taking of these or any wildlife species should be included in such educational materials.

The Atlantic salt marsh snake (*Nerodia clarkii taeniata*) is restricted to coastal Volusia County in its range and is further restricted by habitat to estuarine habitats. Protection of salt marshes, mangrove swamps, and tidal creeks within the Preserve from drainage, ditching, impoundment, and pollution are the most valuable forms of conservation for this species. In addition, the County is working with other government agencies to remove existing mosquito ditching and conduct wetland restoration and enhancement projects where feasible. This activity and the maintenance of the saltmarsh habitat, especially through the continued control of exotic invasive species like Brazilian pepper (*Schinus terebinthifolius*) meet the goals and objectives for this imperiled species.

The implications of the listed bird species is in the management of saltmarshes, adjacent shorelines and wetland habitats. Efforts to continually eradicate, or minimize the presence of exotic invasive species in these habitats, namely Brazilian pepper, is an important management tool for the continued health of the habitat utilized by these species. In addition, fire prevention in high organic wetland hammocks is another important goal. One method to avoid fire encroachment is by fuel consumption / reduction in adjacent fire-dependent habitats.

The bald eagle (*Haliaeetus leucocephalus*) has been removed from the FWC and FWS protected species lists, but is still listed by FNAI. Two active bald eagle nests are located within the Preserve. The nest located on the Turnbull tract is within a flatwoods community and has implication when proposing burning in this area. The nest on the Bolt tract is within maritime hammock where fire is not a proposed management tool. Since the FWC regularly monitors eagle nests, the County will not specifically develop a monitoring plan. The County will monitor the activity / presence of these nests during the course of regular site visits as well as prior to and during land management activities that

will occur in the vicinity of the nests that may have an adverse impact on the nest tree or use of the nest.

The southeastern American kestrel (*Falco sparverius paulus*) utilizes nest sites that include tall dead trees or utility poles generally with an unobstructed view of surroundings. Although the species has not been observed, snags should be left standing where feasible.

The Florida scrub-jay (*Aphelocoma coerulescens coerulescens*) is a species with great implication in regards to management of scrub communities within the Preserve. The scrub habitat on the Preserve is overgrown and the community is in need of restoration, especially in terms of structure as it relates to this species. The Florida scrub-jay inhabits low-growing, oak scrub habitat found on well-drained sandy soils. They may persist in areas with sparse oaks or scrub areas that are overgrown, but at much lower densities and with reduced survivorship. It should be noted that jays utilize not just scrub, but also habitats adjacent to scrub. Thus, the mesic flatwoods, scrubby flatwoods, and scrub found within the Preserve provides the potential for valuable acreage which could be utilized by local scrub-jay families and offspring. Canopy and mid-story biomass reduction within the above habitats is essential to re-establish these areas as optimum Florida scrub-jay habitats.

Continued existence of the Florida scrub-jay species will depend on preservation and long-term management of suitable scrub habitat. While scrub is a fire-maintained community, it is not easily ignited, nor is it an easily controlled fire. Scrub is thought to have burned less frequently than communities with a more easily ignited grassy groundcover, such as sandhill or mesic flatwoods. Scrub oak dominated scrub, as found within the Preserve, likely burned naturally at intervals between 5 and 20 years based on the habitat requirements of the Florida scrub-jay. Oak height is a critical limiting factor for Florida scrub-jays which have been documented to abandon territories where the oaks reached >3 meters. However, a minimum three to five year return interval appears critical based on the time required for re-sprouting oak stems to reach acorn-bearing height in the eastern Atlantic scrub. Acorn production provides an important food source for jays.

Growth rates of scrub oaks are related to burn history and environmental conditions onsite. Long unburned oak scrub, as found on the Preserve, may attain heights unsuitable for scrub-jays up to 50 percent faster after fire than regularly burned oak scrub and thus may at first require shorter burn intervals to maintain optimum heights following restoration of burning. In addition, small openings, needed by Florida scrub-jays for caching acorns, may need to be artificially restored in long unburned scrub by piling up fuel to create hotspots that kill the roots of the oaks. Currently, breaks in the scrub, created by the powerline adjacent to the east boundary of Martina's Dairy tract, and trails provide suitable open space. Similar activities may continue to serve as fire surrogate methods to create open space. Variability in season and frequency of prescribed fires to produce a mosaic of burned and unburned patches would be the most desirable for maintaining high biotic diversity within the scrub and scrubby flatwoods.

The above considerations, and the resulting objectives below, mirror FWC's "Scrub Management Guidelines for Peninsular Florida: Using the Scrub-Jay as an Umbrella Species" (2009). These guidelines should be evaluated as a method of restoration and management of the DLSCP scrub.

The restoration activities discussed that promote Desired Future Conditions and those activities discussed thus far within this subsection are activities that promote the maintenance, enhancement and restoration of the listed and imperiled plant species populations and habitats. As discussed in Section III, user group management and education to prevent harassment (wildlife), or collecting (plants) or to assist in appropriate inventory and management activities also promote these goals.

Objectives:

- Inventory for listed species that may utilize DLSCP, but have not been confirmed
- Partner with learning institutions / agencies / conservation groups to accomplish inventories for imperiled / listed species
- Conduct inventories for protected plant species following habitat disturbances
- Implement habitat restoration (incl. fire / forestry techniques as appropriate)
- Educate visitors and public of presence and importance of listed species
- Protect bald eagle nest trees and area; from harassment, prescribed fire, etc.
- In cooperation with FWC, Volusia County will consider developing a Wildlife Management Strategy in concert with preparation of the Habitat Restoration Plan.

Measurable Parameters (may be extended beyond those listed here):

- List of known imperiled species by habitat / location
- Estimate of listed species populations (may include simple presence/absence estimates per habitat per location)
- Identification of gopher tortoise densities (below, at or above K (carrying capacity); per habitat per tract)
- Habitat restoration, enhancement and maintenance parameters (see above)
- Estimate of herbaceous vegetation in upland habitats
- Number, type and location of educational information

G. Imperiled Natural Communities

Goal: Protect, maintain and restore, where necessary imperiled natural communities

Three (3) natural communities, maritime hammock, scrub, and scrubby flatwoods, on the Preserve are listed by FNAI as Imperiled Natural Communities. The Preserve includes 162.8 acres of maritime hammock, 280.0 acres of scrub, and 254.1 acres of scrubby flatwoods. Management activities include protection from illegal access related to dumping and off-road vehicle (ORV) use and prevention and maintenance of invasion by invasive exotic species. The scrub and scrubby flatwoods require restorative land management activities to reach DFCs.

Objectives:

- Identify and remove debris piles located within maritime hammock
- Develop and Implement Restoration Plan where applicable

Measurable Parameters (may be extended beyond those listed here):

- Acreage of imperiled habitats

- Identify existing and DFC parameters for each
- Habitat restoration parameters for scrub and scrubby flatwoods
- Amount of debris removed / remaining and location in maritime hammock

H. Cultural and Historical Resources

Goal: Identify, protect, preserve, and maintain the cultural resources of DLSCP

There are no historic buildings located within the boundaries of the Preserve. Cultural resource management activities focus on archaeological resources in accordance with *Best Management Practices: An Owners Guide to Protecting Archaeological Sites and Management Procedures for Archaeological and Historical Sites and Properties on State-owned or Controlled Lands* (revised August, 1995). On-going management activities include 1) site documentation, 2) preservation and interpretation, 3) biennial monitoring, and 4) continuing study and interpretation of these sites through partnerships with the Florida Public Archaeology Network, SE Volusia Historical Society, and others.

Site Documentation

There are 15 archaeological sites within the boundaries of the Preserve that are recorded in the Florida Master Site Files, including two National Register sites—Spruce Creek Mound (8VO99) and Sleepy Hollow (8VO7142), listed in 2008. The documentation of these sites has been accomplished through field investigation systematically addressing areas of most probable resources. In partnership with other local governments and grant assistance through the State of Florida, Division of Historical Resources, surveys and reports were completed in 1986, 1989, 1990, 1996, 1997, 1999, 2006, and 2008. New sites shall be similarly documented. National Register nominations will be prepared for sites meeting those criteria. Any naturally occurring fire in the preserve is an opportunity for investigation and documentation. When appropriate, we may take advantage of opportunity for additional investigation using ground-penetrating radar equipment and expertise through the Florida Public Archaeology Network.

As a participant in the Certified Local Government Program in partnership with the National Park Service, Volusia County employs a Historic Preservation Officer who is a member of the Preserve management team and responsible for maintaining cultural resource information including Florida Master Site File Forms, survey reports, site visit reports, monitoring notes, maps depicting locations of recorded sites, and correspondence from the Division of Historical Resources. Artifacts collected on site, either by our staff or cultural resource management firms are properly documented.

Preservation and Interpretation

For management purposes, the entire Preserve is considered to be archaeologically sensitive and investigation is undertaken prior to any site disturbance or recreational uses with potential for ground disturbance, including vehicular, equestrian or pedestrian traffic. Staff members have received Archaeological Resources Management Training (ARM) sponsored by the Bureau of Archaeological Research (BAR) and Volusia County has continuing services agreements with Cultural Resource Management Firms for situations requiring services of a registered public archaeologist.

State law allows for the location of these sites to be undisclosed to the public, in order to protect the sites in the more remote areas of the Preserve from looting and vandalism. We have permitted the surrounding vegetation to camouflage these sites to make it more difficult for potential vandals to locate these sites, and also to reduce erosion. Law enforcement officers are encouraged to participate

in Training for Archaeological Resource Protection (TARP). Kiosks at trail heads post notices informing visitors that archaeological sites should not be disturbed and that artifacts should not be collected.

Particular protections efforts have been focused on the Spruce Creek Mound Complex (8VO99). Prior to Volusia County management, this resource was severely impacted. Early 19th century professional and amateur archaeologists excavated here, preceded and followed by pot hunters through the years. In modern times, prior to public ownership/management, it was used “unofficially” as a bike “ramp.” Under our management this site has been successfully secured with fencing and alternative trail routes that do not impact cultural resources have been provided. There has been no discernable impact to this site since the fencing was installed and the site is regularly monitored. A plan is in place to stabilize the site by introducing sterile fill on top of a barrier cloth. This plan has been discussed in the field with Bureau of Archaeological Research (BAR) staff who concur with this strategy.

An interpretive kiosk is planned for this site, as well as limited interpretative programming through partnership with Florida Public Archaeology Network. Providing appropriate public access to the mound via a stairway and platform with exhibit panels is under consideration. If logistical, permitting and funding issues can be addressed, this would serve both as a protective measure and an interpretive feature. By increasing visitation and building greater awareness for the value of the site we hope to engage the public to help us monitor and protect the sites.

Presently, interpretation for the Smyrna Settlement British Colonial history and archaeology is provided in partnership with the Southeast Historical Society’s museum exhibits and archaeology lab in New Smyrna Beach. Public attention is not directed toward these sites in order to protect them from looting. This is particularly important as most of these fragile features were discovered upon noting surface deposits.

Monitoring

Site conditions are regularly reviewed, checking for any damage caused by natural erosion, impacts from fallen trees, animal damage, impacts from vehicles, horses, bikes or pedestrians, and looting activity. The two most significant sites (Sleepy Hollow and Spruce Creek Mound) and sites more easily accessible to the public are more frequently monitored. Appropriate actions shall be taken to correct/reduce impacts noted during regular monitoring. Monitoring notes are reviewed to determine any patterns of impact that may be prevented or mitigated. In 2010, with assistance from Dot Moore of Southeast Volusia Historical Society, the County conducted monitoring of these known sites.

Objectives:

- The County Historic Preservation officer shall continue maintenance of cultural resource information
- Develop monitoring program for known resources
- Continue to monitor, and protect and preserve resources
- Submit new finds to SHPO for inclusion on the Florida Master Site File
- Implement protection measures to protect Spruce Creek Mound from further erosion
- Monitor user group trails for exposure of new resources and adverse impacts to cultural resources; reroute or close trails accordingly.

- Work with land management and park staff in protection and monitoring of known resources
- Apply best management practices for preservation
- Erect regulatory signage regarding laws protecting the resources from damage, harvest, etc.
- Continue study and interpretation of these sites through partnerships with the Florida Public Archaeology Network, SE Volusia Historical Society, and others.

Measurable Parameters (may be extended beyond those listed here):

- Number and location of known, new and recorded sites
- Status of each site per monitoring event
- Status (% complete) of Spruce Creek Mound protection measures
- Number / linear measure of trails closed or re-routed
- Acreage of habitat surveyed following habitat restoration treatments
- Number and location of regulatory and education signage
- Dates / data of studies or other cooperative efforts with public groups

I. Facilities and Infrastructure

Goal: Develop and Maintain/Improve the capital facilities and infrastructure necessary to meet the goals and objectives of this management plan.

The facilities and infrastructure on DLSCP are numerous and are supported by additional facilities and infrastructure on adjacent County-managed lands within the Optimal Boundary of DLSCP. For the purpose of DLSCP facility and infrastructure management, the County considers the entire managed area, regardless of ownership, as one complete unit. Overall, the facilities and infrastructure currently available and in operation are sufficient to meet the stated goal. The utilization of two Departments within the County improves the effectiveness of meeting this goal. The Volusia County Parks, Recreation and Culture Division is particularly qualified in managing facilities and infrastructure, which allows the Environmental Management Division staff to focus on natural and conservation resources management. Where the objectives overlap, coordination between the Departments will be necessary to determine how to most effectively meet said objective.

Objectives:

- Continue to monitor, maintain and relocate as necessary a system of multi-use trails
- Continue to use existing facilities on adjacent County managed lands for support of DLSCP state-owned lands
- Construct, maintain and update signage, public parking areas, and kiosks
- Maintain gates at appropriate locations to regulate traffic and visitation
- Monitor existing facilities for illegal activities and vandalism
- Consider the development of additional facilities/infrastructure for security purposes
- Acquire additional land within the Optimal Boundary as funding allows

Measurable Parameters (may be extended beyond those listed here):

- Linear measure and location of trails, including breakdown by:
 - Total
 - Final approved
 - Closed / rerouted

- Allowed use
- Number, location of signage, kiosks, etc.
- Inventory of existing and proposed infrastructure (identify new infrastructure by date completed; identify infrastructure occurring on adjacent, non-state owned managed lands)
- Number, location and estimate of spaces provided for public parking
- Record of maintenance on infrastructure, include cost where appropriate
- Reports from caretaker on incidents requiring involvement
- Acreage of acquired tracts, include cost

J. Public Access, Recreational and Educational Opportunities

Goal: Provide public access, recreational and educational opportunities.

Much of the infrastructure and facilities discussed above are provided to support the goal established in this subsection. The management of user groups to prevent misuse of the site's resources is an important objective in allowing continued use of the Preserve.

The County, as lead management agency, is able to supplement the goals and objectives identified here through multiple ongoing recreational and educational programs enacted County-wide. The County has an assigned staff member in charge of educational and recreational activities. The program covers all objectives identified below. Kiosks and signage have been established at key locations to aid in proper access and use by different recreational user groups. The County has partnered with the Volusia County School system to provide space for an onsite environmental resource teacher, located on the Spruce Creek campground site, which is encompassed by the Rose Bay tract. This resource teacher provides environmental educational opportunities on the Preserve and leads the Legacy Program which monitors the water quality conditions of Rose Bay and other waters adjacent to the Preserve.

The Legacy Program is described on Volusia County's environmental website (<http://volusia.org/environmental/rosebay/legacy.htm>):

Mainland High School students under the sure guidance of teacher, Ms. Louise Chapman, have adopted 33 acres of land in between Rose Bay and Spruce Creek in Volusia County as part of the St. Johns River Water Management District's Legacy Program, which brings over 500 students, teachers and advisors together in order to create an outdoor environmental education center, laboratory, and park.

Ms. Chapman coordinates the Rose Bay Legacy project with support services from Volusia County Environmental Management. The Legacy Program coordinator for the SJRWMD is Mr. Dan Hayes, who also provides support from the District. Other Volusia County Government divisions lend technical advice, as well as the Boy Scouts of America, the Native American Community Assoc., Halifax River Audubon Society and many, teachers and administrators from Mainland High School.

The Preserve provides recreational activities including mountain biking, equestrian access, hiking, birding, boardwalks, canoeing, fishing, pavilions and picnic areas, overlook towers, and restrooms. Additional resources, including canoe and kayak launches and/or landings, fishing piers, and overlook platforms may be provided as funding becomes available and are not currently critical objectives to meet the goals established here.

Specifics regarding access by tract and hours, and facilities and uses provided by tract are provided in the Recreation Plan.

Objectives:

- Implement a Recreation and Land Use Concept Plan to include but not limited to:
 - Managing user groups / user impacts
 - Existing abuse
 - Enforcement (incl. methods)
 - Carrying Capacity
 - Approved trail system / uses / locations
 - Primitive camping
 - Canoe launch / landing
 - Educational signage
 - Regulatory signage
 - Use mix / conflicts
 - Resource (cultural and natural) impact
 - Coordination with partners / local jurisdictions
- Cooperate with other agencies, cities, stakeholders, to provide educational and recreational opportunities
- Educate the public on the presence of protected resources and the importance of preservation
- Monitor and maintain a system of multi-use trails
- Exclude off-road vehicle (ORV) use
- Provide and enhance interpretive/education programs (i.e., website, kiosk, guides website)
- Continue to support the Legacy Program
- Provide additional recreational and educational facilities as funding allows

Measurable Parameters (may be extended beyond those listed here):

- Linear measure and location of trails, including breakdown by:
 - Total
 - Final approved
 - Closed / rerouted
 - Allowed use
- Number, location of signage, kiosks, parking, access, etc.
- Number, location, type of security measures (gate, security personnel, signage...)
- Record / reports of abuse, vandalism, user group conflicts, user group impacts (incl. dates, description of event, estimated cost, actual cost in repairs or solutions)
- Dates / data of studies or other cooperative efforts with public groups
- Efforts provided to support Legacy Program (money provided, facilities provided, incl. size, etc.)

K. Conservation Acquisition and Stewardship Partnerships

Goal: Enhance resources and management through development of an optimal boundary that identifies potential important habitats, landscape-scale linkages, wildlife corridors, operational/resource management and access needs by continuing to identify and pursue acquisition needs and conservation stewardship partnerships.

Goal: Develop stewardship partners to achieve management objectives

Beginning with the initial land acquisition program from the mid-1980's, the County, in conjunction with its partners, has been successful in identifying and acquiring additional lands to protect critical habitats and to increase the availability of resources. These partnerships have included municipalities, state agencies, and the St. Johns River Water Management District (SJRWMD).

The County's current program, *Volusia Forever*, provides for the acquisition and management of environmentally sensitive and outdoor recreation lands. The program, created in 2000, is funded through annual ad valorem assessment for a period of twenty years. A portion of this annual revenue is set aside for the management of conservation lands located across the county.

Where feasible, volunteer organizations are utilized to conduct and/or assist the County in the above stated objectives. Objectives that are being accomplished include volunteer efforts by the local Pawpaw Chapter of the Florida Native Plant Society to inventory the plant species occurring on DLSCP.

Objectives:

- Acquire additional land within the Optimal Boundary as funding allows
- Develop and maintain a GIS shapefile and other necessary data to facilitate nominations for additions or deletions to the optimal boundary and to assist the County's and State's programs
- Maintain a list of properties which could be used for possible addition to the optimal boundary or potential acquisition, depending upon the willingness of the affected landowner(s) and available funding
- Identify potential non-governmental organization partnerships and grant program opportunities
- Develop partnerships with other agencies, municipalities, institutions and conservation organizations to achieve stated goals and objectives

Measurable Parameters (may be extended beyond those listed here):

- Acreage of acquired tracts, include cost
- Acreage of tracts remaining for acquisition
- Acreage and identification of tracts to be added / removed from optimal boundary
- List of potential partnerships and funding sources, including amount of funding available
- List of partnerships and activities completed to meet stated goals

Table Summarizing Goals and Objectives for DLSCP

Goals / Objectives		Term (Long v. Short)	Priority	Status
No.	Description			
A	Habitat Restoration and Improvement			
	Restore / improve native habitats trending away from optimal conditions			
	Develop a Habitat Restoration Plan	Short	High	Ongoing
	Implement Restoration Plan where applicable	Short	High	
	Implement Fire Management Plan	Short	High	

Goals / Objectives		Term (Long v. Short)	Priority	Status
No.	Description			
	Implement Timber Assessment / Timber Plan	Long	Low	
B	Fire Management			
	Return fire to appropriate habitats in DLSCP			
	Implement Fire Management Plan	Short	High	
C	Hydrological Preservation and Restoration			
	Protect water quality and quantity, restore hydrology to the extent feasible, and maintain the restored condition			
	Prioritize hydrologic restoration needs in relation to other restoration goals and threat to health of the overall natural community and/or imperiled species			Complete
	Implement hydrological restoration projects where feasible / necessary	Long	Low	Ongoing
	Inventory / monitor trails and infrastructure and manage trails to avoid erosion problems	Short	High	Ongoing
	Consider boardwalks or similar for wetland / water crossings or access (canoe/ kayak launch, etc.)	Short	High	Complete
D	Sustainable Forest Management			
	Manage timber resources for resource conservation and habitat restoration, enhancement, and maintenance through a stewardship ethic that embraces sustainable forest management practices			
	Implement Timber Assessment / Timber Plan	Short	High	
E	Exotic and Invasive Species Maintenance and Control			
	Remove exotic and invasive plants and animals to the maximum extent practicable and conduct ongoing maintenance as needed			
	Continue to inventory and control invasive exotic plant and animal species	Short	High	Ongoing
	Conduct inventories for exotic plant species following habitat disturbances	Short	High	Ongoing
	Remove known invasive, exotic species utilizing appropriate measures	Short	High	Ongoing
F	Imperiled Species Habitat Maintenance, Enhancement, Restoration or Population Restoration			
	Maintain, improve, or restore listed and imperiled species populations and habitats			

Goals / Objectives		Term (Long v. Short)	Priority	Status
No.	Description			
	Inventory for listed species that may utilize DLSCP, but have not been confirmed	Long	Moderate	Ongoing
	Partner with learning institutions / agencies / conservation groups to accomplish inventories for imperiled / listed species	Long	Moderate	Ongoing
	Conduct inventories for protected plant species following habitat disturbances	Short	High	Ongoing
	Implement habitat restoration (incl. fire / forestry techniques as appropriate)	Short	High	
	Educate visitors and public of presence and importance of listed species	Long	Moderate	Ongoing
	Protect bald eagle nest trees and area; from harassment, prescribed fire, etc.	Short	High	Ongoing
G	Imperiled Natural Communities			
	Protect, maintain and restore, where necessary imperiled natural communities			
	Identify and remove debris piles located within maritime hammock	Short	Low	
	Develop and Implement Restoration Plan where applicable	Short	High	
H	Cultural and Historical Resources			
	Identify, protect, preserve, and maintain the cultural resources of DLSCP			
	The County Historic Preservation officer shall continue maintenance of cultural resource information	Short	High	Ongoing
	Develop monitoring program for known resources			Complete
	Continue to monitor, and protect and preserve resources	Short	High	Ongoing
	Submit new finds to SHPO for inclusion on the Florida Master Site File	Short	High	Ongoing
	Implement protection measures to protect Spruce Creek Mound from further erosion	Long	High	
	Monitor user group trails for exposure of new resources and adverse impacts to cultural resources; reroute or close trails accordingly	Short	High	Ongoing
	Apply best management practices for preservation	Short	High	Ongoing
	Erect regulatory signage regarding laws protecting the resources from damage, harvest, etc.	Short	Moderate	

Goals / Objectives		Term (Long v. Short)	Priority	Status
No.	Description			
	Continue study and interpretation of these sites through partnerships with the Florida Public Archaeology Network, SE Volusia Historical Society, and others	Short	Low	Ongoing
I	Facilities and Infrastructure			
	Develop and Maintain/Improve the capital facilities and infrastructure necessary to meet the goals and objectives of this management plan			
	Continue to monitor, maintain and relocate as necessary a system of multi-use trails	Short	High	Ongoing
	Continue to use existing facilities on adjacent County managed lands for support of DLSCP state-owned lands			Complete
	Construct, maintain and update signage, public parking areas, and kiosks	Long	Moderate	Ongoing
	Maintain gates at appropriate locations to regulate traffic and visitation	Long	Moderate	Ongoing
	Monitor existing facilities for illegal activities and vandalism			Complete
	Consider the development of additional facilities/infrastructure for security purposes	Long	Low	Ongoing
	Acquire additional land within the Optimal Boundary as funding allows	Long	Moderate	Ongoing
J	Public Access, Recreational and Educational Opportunities			
	Provide public access, recreational and educational opportunities			
	Implement a Recreation and Land Use Concept Plan	Long	Moderate	Ongoing
	Cooperate with other agencies, cities, stakeholders, to provide educational and recreational opportunities	Long	Moderate	Ongoing
	Educate the public on the presence of protected resources and the importance of preservation	Short	High	Ongoing
	Monitor and maintain a system of multi-use trails	Long	Moderate	Ongoing
	Exclude off-road vehicle (ORV) use			complete
	Provide and enhance interpretive/education programs (i.e., website, kiosk, guides website)	Long	Moderate	Ongoing
	Continue to support the Legacy Program	Short	Moderate	Ongoing
	Provide additional recreational facilities as funding allows	Long	Low	Ongoing
K	Conservation Acquisition and Stewardship Partnerships			

Goals / Objectives		Term (Long v. Short)	Priority	Status
No.	Description			
	Enhance resources and management through development of an optimal boundary that identifies potential important habitats, landscape-scale linkages, wildlife corridors, operational / resource management and access needs by continuing to identify and pursue acquisition needs and conservation stewardship partnerships.			
	Develop stewardship partners to achieve management objectives			
	Acquire additional land within the Optimal Boundary as funding allows	Long	Moderate	Ongoing
	Develop and maintain a GIS shapefile and other necessary data to facilitate nominations for additions or deletions to the optimal boundary and to assist the County's and State's programs			Complete
	Maintain a list of properties which could be used for possible addition to the optimal boundary or potential acquisition, depending upon the willingness of the affected landowner(s) and available funding			Complete
	Identify potential non-governmental organization partnerships and grant program opportunities	Long	Low	Ongoing
	Develop partnerships with other agencies, municipalities, institutions and conservation organizations to achieve stated goals and objectives	Short	High	Ongoing

V. MANAGEMENT CHALLENGES AND STRATEGIES

A. Law Enforcement / Historic Resources

Challenge: Potential for impacts to environmental and historic resources due to public use.

Situated amid an urban/suburban area experiencing significant growth pressures, there presently exists a significant demand for access and use by the public to the Preserve. As the adjacent region continues to grow, it is anticipated that the demand by the public for access to the Preserve will dramatically increase. Addressing this demand in a responsible manner that ensures proper stewardship of the Preserves' environmental and archaeological resources will be a continuing challenge. The protection and preservation of the sensitive environmental and cultural resources (archaeological sites) of the Preserve will remain the fundamental goal guiding management of the Preserve. The Preserve is regularly monitored to identify adverse impacts associated with public use, and where necessary, formulate and implement mitigating or corrective measures. For example, particular effort has been focused on the Spruce Creek Mound Complex (8VO099) which is listed on the National Register of Historic Places. Under Volusia County management this site has been

successfully secured with fencing and alternative trail routes that do not impact cultural resources have been provided. For management purposes, the entire preserve is considered to be archaeologically sensitive and investigation is undertaken prior to any site disturbance or recreational uses with potential for ground disturbance, including frequent pedestrian traffic. The general policy is not to provide the location of these sites to the public. This is a legitimate and effective tool to protect the sites in the more remote areas of the preserve from looting. The County has also permitted the surrounding vegetation to camouflage these sites, making it more difficult for potential looters to locate the sites. It is our intent to continue to provide the public with appropriate opportunities to use and enjoy the Preserve. However, these activities are to be offered in a way that is compatible with and furthers the over-arching strategy of providing proper protection of the Preserves' significant and sensitive environmental and archaeological resources.

Strategy:

- 1) Establish / maintain the presence of a caretaker who resides within or near the Preserve,
- 2) Ensure the caretaker's responsibilities include the entire Preserve
- 3) Continue to maintain gates at locations with limited access
- 4) Implement barriers to use of culturally sensitive resources

B. Habitat Management

Challenge: Many years of fire suppression has altered the strata of the fire dependant communities and reduced the potential suitability of the site for upland listed wildlife species.

Management issues related to the sandhill, scrub, scrubby flatwoods and shell mound communities create a challenge. The mosaic of natural communities within the Preserve is comprised of a wide variety of habitats, including several that are rare. These communities are of varying quality and stages of maturity/succession. Several of the communities also present challenging management opportunities, especially given the location of the Preserve. For example, several communities are dependent upon a comparably frequent fire interval. The use of prescribed fire within the Preserve is fraught with practical difficulties.

Given concerns for ecological values and mitigation of hazard to adjacent developments, a prescribed fire plan will be implemented subsequent to final approval. Due to smoke sensitive areas, such as Interstate 95, US Hwy 1, New Smyrna Beach Airport and surrounding residential communities, the plan will address challenges such as the substantial difficulty in sustaining a sufficient fire frequency to maintain healthy ecosystems and the protection of archaeological resources, and possible solutions such as mechanical alternatives to prescribed fire. The Preserve is situated amid an urban/suburban area that is experiencing significant growth pressures. While pockets of residential use have existed for years adjacent to the Preserve, residential development at the periphery of the Preserve has significantly increased in recent years in response to the heightened demand associated with the regions population growth. Aside from adjacent residential land use, the Preserve is also bounded or traversed by the regional thoroughfares of Interstate 95 and U.S. 1. The Preserve is also traversed by a primary railroad line. Also, the New Smyrna Beach airport is located a short distance from the Preserve. In addition to being adjacent to the aforementioned "smoke-sensitive areas", the wind

pattern of this region also complicates the use of prescribed fire. The prevailing wind pattern in this portion of the county is an easterly/westerly direction. However, the narrow smoke corridor that may be acceptable for prescribed burning is oriented in a north to south direction. Regardless of these concerns, it is noted that the County, like public agency land managers across the state, has experienced conditions that have significantly hindered efforts to undertake a consistent program of prescribed burning.

Strategy:

- 1) Implement the Prescribed Fire Plan
- 2) Conduct mechanical and other fire surrogate activities where necessary
- 3) Utilize “small” (e.g., 25 ac) burn units in scrub and scrubby flatwoods

C. Prescribed Fire

Challenge: The use of prescribed fire as a management tool at the Preserve is hindered by several outside variables.

Several constraints exist that influence how and when prescribed fire can be implemented at the Preserve. These constraints include residential housing to the north and northeast, I-95 to the west, US Highway 1 to the east, residential development, the golf course and New Smyrna Beach Airport to the south. These surrounding land uses have implications for smoke management in association with prescribed burning. Smoke management must be considered for the major highway areas to maintain safe driving conditions for these thoroughfares. Similar concerns exist for the New Smyrna Beach Airport, where visibility for incoming and outgoing air traffic must be maintained. In addition to smoke management constraints, the railroad right-of-way imposes an access constraint for workers and equipment to conduct prescribed fires in certain areas. Attention to weather conditions, proper management techniques, and education of surrounding residents can reduce some of these conflicts.

Another constraint is that in overgrown scrub conditions as found at the Preserve, extreme conditions must exist for the scrub to burn, such as high temperatures, high winds, low humidity's, and low fuel moistures. These conditions result in fires which are hot, intense, move quickly through the crown and can be hard to contain in small units.

Resistance to the use of prescribed fire as a management tool has been encountered within residential and commercial developments adjacent to managed lands. This is largely a result of smoke management issues and perceived damages to the environmental setting.

Strategy:

- 1) In association with the prescribed burn plan, an extensive public education program should be established to educate neighbors and users of the project site. This education program could include elements such as smoke management, the scheduling of prescribed fires, aesthetic value of the burn, the long-term protection of adjacent properties, and the importance of fire for wildlife and plant habitat.

D. Development Encroachment

Challenge: Adjoining lands are at risk for future development or other land use changes. Such changes could compromise carrying out the necessary management and thus reduce the quality and integrity of the natural systems at the Preserve.

One of the attributes of the Preserve, and also one of the challenges presented to management, is its location. The Preserve is situated amid an urban/suburban area that is experiencing significant growth pressures. This population growth has heightened the demand for residential uses. As a result, residential development at the periphery of the Preserve has increased in recent years. Much of this activity has occurred since development of the management plan. This development and growth has, and will continue to, present a range of challenges related to stewardship of the Preserve. These issues include the ability to perform certain resource management activities and increased user demand/expectations. Adding to this complexity is the configuration of the Preserve boundaries (increased edge) and that the lands adjoining the Preserve are within three different jurisdictions – County of Volusia (unincorporated) and the municipalities of Port Orange and New Smyrna Beach. Decisions regarding use(s) of lands adjoining the Preserve reside with the appropriate jurisdiction. The staff is aware of these concerns and strives to appropriately address the issues associated with this dynamic environment. The County, using established procedures, strives to cooperate with adjacent jurisdictions to minimize potential land use conflicts.

For example, the County, its partners, and the City of Port Orange worked to preclude adjacent development impacts by acquiring title to eight separate ownerships comprising approximately 514 acres of in-holdings and additions since the year 2000. The costs associated with these acquisitions collectively total approximately \$14.5 million, including the contributions of our agency partners. The City of Port Orange has also acquired 225 acres, with a cost of approximately \$5.6 million. These acquisitions facilitate comprehensive management of the Preserve and have eliminated the potential for adverse impacts that may have otherwise be associated with development of the affected properties had each remained in private ownership. The management review team specifically commended the County on these efforts. Additional protection has been sought for the valuable resources encompassed by the Preserve from the potential impacts associated with development of adjacent properties by successfully amending the boundaries to encompass additional area. Subsequently, acquisitions of the properties within this expanded area are a priority. A potential partner in this effort has been the Division of State Lands. Concerns associated with adjacent land uses are also monitored on a more routine level. For example, staff has worked with a resident to assure that public demand for access to the shoreline adjacent to his residence is provided in a balanced, responsible, manner.

Strategy:

- 1) Identify-adjoining parcels with meaningful natural resource values and willing sellers which may be considered for possible future acquisition.
- 2) Establish and maintain positive rapport with adjoining landowners and jurisdictions.

- 3) With concurrence of municipalities with jurisdiction and Volusia County, pursue agreement relating to management and encroachment adjacent to preserve and land use changes
- 4) Should the County partner with another jurisdiction for the acquisition of land within the Preserve, a mutually acceptable management agreement is to be prepared.

E. Timber Resources

Challenge: Minimal areas within the Preserve provide merchantable timber and access is limited.

Portions of the Rose Bay property contain slash pine stands with value as timber. The constraint to utilizing this area is that vehicular access to this area is very limited. The Rose Bay property is bound to the east by salt marsh, the north and south by open water, and to the west by railway.

Strategy:

- 1) A timber assessment / timber plan will be completed for those areas which provide potential for timber harvest.

F. Scrub Management Costs

Challenge: Locating funding for the costs associated with the planning of the management of the scrub habitats and the construction costs to complete the land management activities.

Strategy:

- 1) Implement restoration in limited acreages as funds allow

VI. PRIORITY SCHEDULING, COST ESTIMATES AND FUNDING SOURCES FOR CONDUCTING MANAGEMENT ACTIVITIES

A. Priority Scheduling

The short and long term goals established in Section IV above, along with their designated priority levels were used to develop a Priority Schedule. The schedule is divided into three chronological sections; 1-2 years, 2-5 years, and 6-10 years. The schedule will be used to develop costs estimates for land management activities.

Schedule of Events Years 1 -2:

Section / Objectives		Parameter(s)
A	Habitat Restoration and Improvement	
	Develop a Habitat Restoration Plan	Planning
	Implement Restoration Plan where applicable	Min 25 ac. Scrub / Min. 50 ac total – Per year
	Implement Fire Management Plan (incl. fire or surrogate techniques as appropriate)	Min 25 ac. Scrub / Min. 50 ac total – Per year
B	Fire Management	

Section / Objectives		Parameter(s)
	Implement Fire Management Plan (incl. fire or surrogate techniques as appropriate)	Min 25 ac. Scrub / Min. 50 ac total – Per year
C	Hydrological Preservation and Restoration	
	Inventory / monitor trails and infrastructure and manage trails to avoid erosion problems	Recurring task
	Consider boardwalks / water crossings or access	Planning
D	Sustainable Forest Management	
	Not within timeframe	Not within timeframe
E	Exotic and Invasive Species Maintenance and Control	
	Continue to inventory and control invasive exotic plant and animal species	Recurring task
	Conduct inventories for exotic plant species following habitat disturbances	Recurring task
	Remove known invasive, exotic species utilizing appropriate measures	Recurring task
F	Imperiled Species Habitat Maintenance, Enhancement, Restoration or Population Restoration	
	Conduct inventories for protected plant species following habitat disturbances	Min 25 ac. Scrub / Min. 50 ac total – Per year
	Implement habitat restoration (incl. fire / forestry techniques as appropriate)	Min 25 ac. Scrub / Min. 50 ac total – Per year
	Protect bald eagle nest trees and area; from harassment, prescribed fire, etc.	Only applies to Bolt and Turnbull Tracts – recurring task
G	Imperiled Natural Communities	
	Identify and remove debris piles located within maritime hammock	Amount TBD in the field
	Develop and Implement Restoration Plan where applicable	Min 25 ac. Scrub – Per year
H	Cultural and Historical Resources	
	The CHPO shall continue maintenance of cultural resource information	Recurring task
	Continue to monitor, and protect and preserve resources	Recurring task
	Submit new finds to SHPO for inclusion on the Florida Master Site File	Recurring task
	Monitor user group trails; reroute or close trails accordingly	Recurring task
	Apply best management practices for preservation	Recurring task
	Erect regulatory signage regarding laws protecting the resources from damage, harvest, etc.	Recurring task

Section / Objectives		Parameter(s)
	Continue study and interpretation of these sites through partnerships with the Florida Public Archaeology Network, SE Volusia Historical Society, and others	Recurring task
I	Facilities and Infrastructure	
	Continue to monitor, maintain and relocate as necessary a system of multi-use trails	Recurring task
	Monitor existing facilities for illegal activities and vandalism	Recurring task
J	Public Access, Recreational and Educational Opportunities	
	Educate the public on the presence of protected resources and the importance of preservation	Kiosk and website information
	Exclude off-road vehicle (ORV) use	Recurring task
	Continue to support the Legacy Program	Recurring task
K	Conservation Acquisition and Stewardship Partnerships	
	Develop partnerships with other agencies, municipalities, institutions and conservation organizations to achieve stated goals and objectives	Recurring task

Schedule of Events Years 3-5:

Goals / Objectives		Parameter(s)
A	Habitat Restoration and Improvement	
	Implement Restoration Plan where applicable	Min 25 ac. Scrub or Scrubby Flatwoods / Min. 25 ac total – Per year
	Implement Fire Management Plan (incl. fire or surrogate techniques as appropriate)	Min. 25 ac total – Per year; Minimum 225 acres by end of year 5
B	Fire Management	
	Implement Fire Management Plan (incl. fire or surrogate techniques as appropriate)	Min. 25 ac total – Per year; Minimum 225 acres by end of year 5
C	Hydrological Preservation and Restoration	
	Inventory / monitor infrastructure and manage trails to avoid erosion problems	Recurring task
D	Sustainable Forest Management	
	Not within timeframe	Not within timeframe
E	Exotic and Invasive Species Maintenance and Control	
	Continue to inventory and control invasive exotic plant and animal species	Recurring task
	Conduct inventories for exotic plant species following habitat disturbances	Recurring task
	Remove known invasive, exotic species utilizing appropriate measures	Recurring task

Goals / Objectives		Parameter(s)
F	Imperiled Species Habitat Maintenance, Enhancement, Restoration or Population Restoration	
	Inventory for listed species that may utilize DLSCP, but have not been confirmed	Utilize FNAI or other partnerships as available
	Partner with institutions / groups to accomplish inventories	Partner with FNAI / FNPS and similar organizations
	Conduct inventories for protected plant species following habitat disturbances	Min 25 ac. Scrub or Scrubby Flatwoods / Min. 25 ac total – Per year
	Implement habitat restoration (incl. fire / forestry techniques as appropriate)	Min 25 ac. Scrub or Scrubby Flatwoods / Min. 25 ac total – Per year
	Educate visitors and public of presence and importance of listed species	Kiosk, website information
	Protect bald eagle nest trees and area; from harassment, prescribed fire, etc.	Only applies to Bolt and Turnbull Tracts – recurring task
G	Imperiled Natural Communities	
	Identify and remove debris piles located within maritime hammock	Monitor for new / remaining debris
	Develop and Implement Restoration Plan where applicable	Min 25 ac. Scrub or Scrubby Flatwoods – Per Year
H	Cultural and Historical Resources	
	The County Historic Preservation officer shall continue maintenance of cultural resource information	Recurring task
	Continue to monitor, and protect and preserve resources	Recurring task
	Submit new finds to SHPO for inclusion on the Florida Master Site File	Recurring task
	Implement protection measures to protect Spruce Creek Mound from further erosion	Have at least 50% of plan completed
	Monitor trails for exposure of, and impacts to resources; reroute or close trails accordingly	Recurring task
	Apply best management practices for preservation	Recurring task
	Erect regulatory signage	Recurring task
	Continue study of sites through partnerships	Recurring task
I	Facilities and Infrastructure	
	Continue to monitor, maintain and relocate as necessary a system of multi-use trails	Recurring task
	Continue to use existing facilities on adjacent County managed lands for support of DLSCP state-owned lands	Recurring task

Goals / Objectives		Parameter(s)
	Construct, maintain and update signage, public parking areas, and kiosks	Provided on an as-needed basis & based on Recreation Plan
	Maintain gates at appropriate locations to regulate traffic and visitation	Provided on an as-needed basis & based on Recreation Plan
	Monitor existing facilities for illegal activities and vandalism	Recurring task
	Acquire additional land within the Optimal Boundary as funding allows	As funding allows
J	Public Access, Recreational and Educational Opportunities	
	Implement a Recreation and Land Use Concept Plan	Identify specific location of proposed features
	Cooperate with other agencies, cities, stakeholders, to provide educational and recreational opportunities	Host public meeting / advisory group
	Monitor and maintain a system of multi-use trails	Recurring task
	Exclude off-road vehicle (ORV) use	Recurring task
	Provide and enhance interpretive/education programs (i.e., website, kiosk, guides website)	Kiosk, website information
	Continue to support the Legacy Program	Recurring task
K	Conservation Acquisition and Stewardship Partnerships	
	Acquire additional land within the Optimal Boundary as funding allows	As funding allows
	Identify potential non-governmental organization partnerships and grant program opportunities	Planning task
	Develop partnerships with other agencies, municipalities, institutions and conservation organizations to achieve stated goals and objectives	Recurring task

Schedule of Events Years 6-10:

Goals / Objectives		Parameter(s)
A	Habitat Restoration and Improvement	
	Implement Restoration Plan where applicable	TBD at beginning of year 6
	Implement Fire Management Plan (incl. fire or surrogate techniques as appropriate)	Based on previous acreages burned – acreage should be sufficient to maintain fire return intervals – minimum 350 acres total burned by end of year 10
	Implement Timber Assessment / Timber Plan	Re-evaluate BA (basal area) on Turnbull; determine viability of access to Rose Bay; re-evaluate market for Martin's Dairy
B	Fire Management	
	Return fire to appropriate habitats in DLSCP	

Goals / Objectives		Parameter(s)
	Implement Fire Management Plan (incl. fire or surrogate techniques as appropriate)	Based on previous acreages burned – acreage should be sufficient to maintain fire return intervals – minimum 350 acres total burned by end of year 10
C	Hydrological Preservation and Restoration	
	Prioritize hydrologic restoration needs in relation to other restoration goals and threat to health of the overall natural community and/or imperiled species	Update list
	Implement hydrological restoration projects where feasible / necessary	Based on work with SJRWMD and other partnerships
	Inventory / monitor trails and infrastructure and manage trails to avoid erosion problems	Recurring task
	Consider boardwalks or similar for wetland / water crossings or access (canoe/ kayak launch, etc.)	Develop 1 water landing / access point
D	Sustainable Forest Management	
	Implement Timber Assessment / Timber Plan	Re-evaluate BA on Turnbull; determine viability of access to Rose Bay; re-evaluate market for Martin's Dairy
E	Exotic and Invasive Species Maintenance and Control	
	Continue to inventory and control invasive exotic plant and animal species	Recurring task
	Conduct inventories for exotic plant species following habitat disturbances	Recurring task
	Remove known invasive, exotic species utilizing appropriate measures	Recurring task
F	Imperiled Species Habitat Maintenance, Enhancement, Restoration or Population Restoration	
	Inventory for listed species that may utilize DLSCP, but have not been confirmed	Recurring task; update list of observed species and locations; determine target survey areas; monitor known sites
	Partner with learning institutions / agencies / conservation groups to accomplish inventories for imperiled / listed species	Recurring task; update list of observed species and locations; determine target survey areas; monitor known sites
	Conduct inventories for protected plant species following habitat disturbances	Recurring task; update list of observed species and locations; determine target survey areas; monitor known sites
	Protect bald eagle nest trees and area; from harassment, prescribed fire, etc.	Only applies to Bolt and Turnbull Tracts – recurring task
G	Imperiled Natural Communities	
	Develop and Implement Restoration Plan where applicable	Determine remaining acreage requiring restoration, and location
H	Cultural and Historical Resources	

Goals / Objectives		Parameter(s)
	The County Historic Preservation officer shall continue maintenance of cultural resource information	Recurring task
	Continue to monitor, and protect and preserve resources	Recurring task
	Submit new finds to SHPO for inclusion on the Florida Master Site File	Recurring task
	Implement protection measures to protect Spruce Creek Mound from further erosion	Complete this project
	Monitor user group trails for exposure of new resources and adverse impacts to cultural resources; reroute or close trails accordingly	Recurring task
	Apply best management practices for preservation	Recurring task
	Maintenance as necessary for regulatory signage regarding laws protecting the resources from damage, harvest, etc.	As needed basis
	Continue study and interpretation of these sites through partnerships with the Florida Public Archaeology Network, SE Volusia Historical Society, and others	Recurring task
I	Facilities and Infrastructure	
	Continue to monitor, maintain and relocate as necessary a system of multi-use trails	Recurring task
	Continue to use existing facilities on adjacent County managed lands for support of DLSCP state-owned lands	Recurring task
	Construct, maintain and update signage, public parking areas, and kiosks	Install remaining kiosks; signage
	Maintain gates at appropriate locations to regulate traffic and visitation	Recurring task
	Monitor existing facilities for illegal activities and vandalism	Recurring task
	Consider the development of additional facilities/infrastructure for security purposes	TBD
	Acquire additional land within the Optimal Boundary as funding allows	As funding allows
J	Public Access, Recreational and Educational Opportunities	
	Implement a Recreation and Land Use Concept Plan	Update inventory; determine priority for development / implementation; develop at least 1 water landing / access

Goals / Objectives		Parameter(s)
	Cooperate with other agencies, cities, stakeholders, to provide educational and recreational opportunities	Conduct 1 public meeting – status update
	Monitor and maintain a system of multi-use trails	Recurring task
	Exclude off-road vehicle (ORV) use	Recurring task
	Provide and enhance interpretive/education programs (i.e., website, kiosk, guides website)	Update as necessary
	Continue to support the Legacy Program	Recurring task
	Provide additional recreational facilities as funding allows	Develop at least 1 water landing, as funding allows
K	Conservation Acquisition and Stewardship Partnerships	
	Acquire additional land within the Optimal Boundary as funding allows	As funding allows
	Develop and maintain a GIS shapefile and other necessary data to facilitate nominations for additions or deletions to the optimal boundary and to assist the County's and State's programs	Assist State with update
	Maintain a list of properties which could be used for possible addition to the optimal boundary or potential acquisition, depending upon the willingness of the affected landowner(s) and available funding	Assist State with update
	Identify potential non-governmental organization partnerships and grant program opportunities	Planning task
	Develop partnerships with other agencies, municipalities, institutions and conservation organizations to achieve stated goals and objectives	Recurring task

B. Cost Estimates

The cost estimates provided here reflect the costs necessary to achieve the goals stated above, and organized in a manner consistent with the Land Management Uniform Accounting Council, Chapter 259.037(3)(a) as provided below:

259.037 Land Management Uniform Accounting Council.

All land management activities and costs must be assigned to a specific category, and any single activity or cost may not be assigned to more than one category. Administrative costs, such as planning or training, shall be segregated from other management activities. Specific management activities and costs must initially be grouped, at a minimum, within the following categories:

1. Resource management.
2. Administration.

3. Support.
4. Capital improvements.
5. Recreation visitor services.
6. Law enforcement activities.

Short Term Annual Expenditure Estimate (Years 1 - 2):

1. Resource management	Annual Cost
Habitat restoration	
Prescribed burning	
Exotic species control	
Listed species survey and protection	
Cultural resource management	
Timber Management	
Hydrological Management	
Other	
Subtotal	\$65,000
2. Administration	
General Administration	\$5,120
3. Support	
Resource Management Planning	
Land Management Review	
Training / Staff Development	
Vehicle / Equipment Operation & Maintenance	\$8,250
Other	
Subtotal	
4. Capital improvements	
New construction	
Facility/ infrastructure maintenance	
Subtotal	\$5,150
5. Recreation visitor services	
Signage; operations; programs	
Public meetings	
Subtotal	\$8,100
6. Law enforcement activities	
Resource protection	\$2,000
TOTAL	\$93,620

Long Term Annual Expenditure Estimate (Years 3 - 10):

1. Resource management	Annual Cost
Habitat restoration	
Prescribed burning	
Exotic species control	
Listed species survey and protection	

Cultural resource management	
Timber Management	
Hydrological Management	
Other	
Subtotal	\$70,000
2. Administration	
General Administration	\$5,430
3. Support	
Resource Management Planning	
Land Management Review	
Training / Staff Development	
Vehicle / Equipment Operation & Maintenance	
Other	
Subtotal	\$8,850
4. Capital improvements	
New construction	
Facility/ infrastructure maintenance	
Subtotal	\$12,650
5. Recreation visitor services	
Signage; operations; programs	
Public meetings	
Subtotal	\$8,100
6. Law enforcement activities	
Resource protection	\$2,000
TOTAL	\$107,030

C. Estimated Revenue Sources

Revenue resources for accomplishing the above goals come from different sources depending upon the Division. Any revenue received by either Division, represents only a small fraction of the costs associated with management of the property.

Thus the revenue falls short of meeting all stated objectives. The County will follow the priority schedule to achieve high priority items first. Additional sources of revenue, and working with partners will be sought to fill the gaps where funding is not adequate. The partnerships have been listed above. Revenue from timber is discussed in the Timber Assessment / Timber Plan, but is expected to be nominal at best. Mitigation revenue, related to wetland and/or protected species, is not included as the County does not currently accept mitigation on their public lands. This may be re-evaluated in the long term. Additionally, grants will be explored for funding specific tasks.

VII. ANALYSIS OF POTENTIAL FOR CONTRACTING PRIVATE VENDORS FOR RESTORATION AND MANAGEMENT

The following management and restoration activities have been considered for outsourcing to private entities. It has been determined that items selected as “approved” below are those that Volusia County either does not have in-house expertise to accomplish or which can be done at less cost by an outside provider of services. Those items selected as “rejected” represent those for which Volusia County has in-house expertise and/or which the agency has found it can accomplish at less expense than through contracting with outside sources. “Conditional” items are those that could be done either by an outside provider or by the agency at virtually the same cost or with the same level of competence:

Activity	Approved	Conditional	Rejected
Road/Trail Development and Maintenance		X	
Mosquito Ditch Removal		X	
Prescribed Burning			X
Vegetation Inventories		X	
Timber Harvest Activities	X		
Mechanical Restoration Activities		X	
Public Contact and Educational Facilities Development		X	
Exotic Species Control		X	
Management Plan Development		X	
Imperiled Species Survey / Monitoring		X	
Habitat Restoration Plan Development		X	

VIII. LAND MANAGEMENT REVIEW

In compliance with Chapter 259.036, F. S. the Department of Environmental Protection (DEP) Division of State Lands (DSL) conducted a review of DLSCP to determine whether conservation, preservation, and recreation lands owned by the state Board of Trustees of the Internal Improvement Trust Fund (Board) are being managed properly. In compliance with directives of the statute the DEP to established a land management review team in 2007 that evaluated the extent to which the existing management plan provided sufficient protection to threatened or endangered species, unique or important natural or physical features, geological or hydrological functions, and archaeological features. The team also evaluated the extent to which the land is being managed for the purposes for which it was acquired and the degree to which actual management practices, including public access, are in compliance with the adopted management plan. A complete report of the review team findings and the County’s responses to items addressed by the Review Team is provided in Appendix I.

The team provided both commendations and recommendations for the Plan and for implementation of the Plan. The recommendations are summarized below, focusing on those actions or portions of the Plan that were found to be insufficient. The responses below each item provide a brief summary of corrective actions taken by the County.

The County is currently establishing annual monitoring of all known archaeological sites on the property, including photographic documentation and GIS mapping. There are 15 known archaeological sites (all documented in the Florida Master Site Files) located within the state owned lands of the preserve. Those sites with more frequent visitor access are frequently monitored for natural and man-made impacts. The more remote sites are routinely monitored and documented.

The County has prioritized the protection of environmentally sensitive and archaeological sites within the Preserve as the main priority in determining public recreational use of the property. We anticipate that as the adjacent region continues to grow, the demand by the public for access to the Preserve will dramatically increase. The Preserve will continue regular monitoring to identify adverse impacts associated with public use, and where necessary, formulate and implement mitigating or corrective measures including the implementation of a law enforcement post within the Preserve. It is our intent to continue to provide the public with appropriate opportunities to use and enjoy the Preserve. However, these activities are to be offered in a way that is compatible with and furthers the over-arching strategy of providing proper protection of the Preserves' significant and sensitive environmental and archaeological resources.

Although most of the acreage associated with Doris Leeper Spruce Preserve is not appropriate for timber harvesting, a Timber Assessment / Timber Plan for the remaining acreage has been developed and is included in Appendix H of the Management Plan.

In order to improve protection of the Preserve from illegal encroachments and vandalism, Volusia County aims to provide an offsite residence for law enforcement adjacent to the Preserve. The duties of this individual, include patrolling Preserve grounds and to act a deterrent to vandalism. The County has expended approximately \$50,000 to maintain the residence and surrounding grounds as part of this commitment to protecting the resources and users of the Preserve. Please refer to Section V for further details regarding law enforcement presence.

The facilities and infrastructure on the Preserve are numerous and are supported by additional facilities and infrastructure on adjacent County-owned lands within the Optimal Boundary of DLSCP. For the purpose of the Preserve facility and infrastructure management, the County considers the entire managed area, regardless of ownership, as one complete unit. Overall, the facilities and infrastructure currently available and in operation appear sufficient to meet the stated goal. The utilization of two Departments within the County improves the effectiveness of meeting this goal. The Volusia County Parks, Recreation and Culture Division is particularly qualified in managing facilities and infrastructure, which allows Environmental Management Division staff to focus on natural and conservation resources management. Where the objectives overlap, coordination between the Departments will be necessary to determine how to most effectively meet said objective. Please refer to section IV.I.

The County is in the process of developing a scrub jay monitoring and habitat restoration plan for the Preserve. Monitoring over all suitable habitats within the Preserve was conducted in July of 2010. Details regarding the results of this survey can be found in Appendix E. A Timber Assessment / Timber Plan can be found in Appendix H which outlines the restoration plan for habitat improvements.

Revised Habitat Maps with FNAI natural community categories can be found on pages 23-27 of the Management Plan. Detailed descriptions of these natural communities can be found in Section II.B.1.

A Prescribed Fire Plan has been developed and is included in Appendix G of the Management Plan.

Please refer to Section II.D.1 and IV.F for details related to plant and wildlife species management and inventory.

Please refer to Section IV.H for details related to the protection and preservation of cultural resources.

Please refer to Section IV.B and Appendix G for details related to prescribed fire within the Preserve.

Please refer to Section II and IV.A for details relating to the efforts to restore pastures and mosquito ditches within the Preserve. Australian pine has been eradicated from the Preserve.

Please refer to Section II and IV.E for details relating to non-native invasive and problem species

Please refer to Section IV.I. for details relating to resource protection including the gates and fencing, signage and law enforcement presence

With regards to adjacent property concerns, including expanding development, one of the attributes of the Preserve, and also one of the challenges presented to management, is its location. The Preserve is situated amid an urban/suburban area that is experiencing significant growth pressures. This population growth has heightened the demand for residential uses. As a result, residential development at the periphery of the Preserve has increased in recent years. Much of this activity has occurred since development of the management plan. This development and growth has, and will continue to, present a range of challenges related to stewardship of the Preserve. The relationship between management of the Preserve and adjacent land uses (existing and future) will continuously be evaluated and addressed as part of the management plan.

Please refer to Section IV.J for details related to public access and education

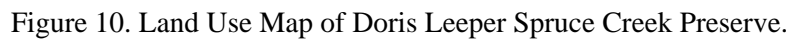
A mixture of public access and recreational uses are planned for the Preserve. The Preserve is overseen by the Volusia County Parks, Recreation and Culture Division. The Environmental Management Division provides support where necessary.

IX. COMPLIANCE WITH STATE, FEDERAL AND LOCAL GOVERNMENT REQUIREMENTS

The proposed activities within this Plan are in accordance with state, federal and local government requirements and regulations. Some activities proposed may require permits from these agencies prior to implementation. This is primarily related to infrastructure and facility construction. Any such proposed construction activities will be reviewed with the appropriate agencies. This will include, but not necessarily limited to, Florida Department of Environmental Protection, St. Johns River Water Management District, Army Corps of Engineers, City of New Smyrna Beach, City of Port Orange, Volusia County, Florida Department of Transportation, etc.

Where practicable, all facilities are designed and constructed to comply with the American Disabilities Act (Public Law 101-336). The universal access requirements of this law are followed in all cases except where the law allows for reasonable exceptions, such as when handicap access is structurally impractical or when providing access fundamentally changes the purpose / character of the facility.

Uses planned for DLSCP are in compliance with the Conceptual State Lands Management Plan and its requirement for “balanced public utilization,” and are in compliance with the eight Florida Forever goals, as well as the guidance and directives of Chapters 372, 253, 259, 327, 370, 403, 870, 373, 375, 378, 487, and 597 FS. This plan is also in conformance with the Local Government Comprehensive Plan for Volusia County, Florida, as approved and adopted. The letter confirming compliance is contained in Appendix M.



X. SOIL AND WATER RESOURCE CONSERVATION

The County will continue to employ best management practices for activities and projects which potentially impact soil and water in order to minimize soil erosion and protect water quality. Soil disturbing activities will be conducted only in areas that present the least likelihood of causing erosion problems, avoiding the steepest slopes, streamside management zones and impacts to cultural resources. Soil disturbing activities will follow landform contours to the extent practicable and will not occur without assessment against potential impacts to cultural resources and supervision during such activities by the CHPO or designee. On areas that have been discovered that may prevent erosion problems, an assessment will be made to determine if soil erosion is occurring, and if so, appropriate measures will be implemented to stop or control the effects of this erosion. An example of such measures was the fencing, trail relocation and tree removal along the bluff trail along Spruce Creek on the Martin's Dairy tract where users groups were utilizing a rope swing and causing erosion when climbing the bank back to the trail. These items are more specifically addressed in Section IV, above.

XI. LITERATURE CITED

Technical Literature References

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APPENDIX A:
Lease Agreement Number 4195

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BOARD OF TRUSTEES OF THE INTERNAL
IMPROVEMENT TRUST FUND OF THE
STATE OF FLORIDA

LEASE AGREEMENT
SPRUCE CREEK

Lease No. 4195

THIS LEASE AGREEMENT, made and entered into this 12th day of January 2001, by and between the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA hereinafter referred to as "LESSOR", and VOLUSIA COUNTY, FLORIDA hereinafter referred to as "LESSEE".

LESSOR, for and in consideration of mutual covenants and agreements hereinafter contained, does hereby lease to said LESSEE, the lands described in paragraph 2 below, together with the improvements thereon, and subject to the following terms and conditions:

1. DELEGATIONS OF AUTHORITY: LESSOR'S responsibilities and obligations herein shall be exercised by the Division of State Lands, Department of Environmental Protection.
2. DESCRIPTION OF PREMISES: The property subject to this lease, is situated in the County of Volusia, State of Florida and is more particularly described in Exhibit "A" attached hereto and hereinafter called the "leased premises".
3. TERM: The term of this lease shall be for a period of fifty (50) years commencing on January 12, 2001 and ending on January 11, 2051 unless sooner terminated pursuant to the provisions of this lease.
4. PURPOSE: LESSEE shall manage the leased premises only for the conservation and protection of natural and historical resources and for resource based public outdoor activities and education which are compatible with the conservation and protection of these public lands, as set forth in subsection 259.032(11), Florida Statutes, along with other related uses

necessary for the accomplishment of this purpose as designated in the Management Plan required by paragraph 8 of this lease.

5. QUIET ENJOYMENT AND RIGHT OF USE: LESSEE shall have the right of ingress and egress to, from and upon the leased premises for all purposes necessary to the full quiet enjoyment by said LESSEE of the rights conveyed herein.

6. UNAUTHORIZED USE: LESSEE shall, through its agents and employees, prevent the unauthorized use of the leased premises or any use thereof not in conformity with this lease.

7. ASSIGNMENT: This lease shall not be assigned in whole or in part without the prior written consent of LESSOR, which consent shall not be unreasonably withheld. Any assignment made either in whole or in part without the prior written consent of LESSOR shall be void and without legal effect.

8. MANAGEMENT PLAN: LESSEE shall prepare and submit a Management Plan for the leased premises in accordance with subsection 18-2.021(4), Florida Administrative Code, within twelve months of the effective date of this lease. The Management Plan shall be submitted to LESSOR for approval through the Division of State Lands, Department of Environmental Protection. The leased premises shall not be developed or physically altered in any way other than what is necessary for security and maintenance of the leased premises without the prior written approval of LESSOR until the Management Plan is approved. LESSEE shall provide LESSOR with an opportunity to participate in all phases of preparing and developing the Management Plan for the leased premises. The Management Plan shall be submitted to LESSOR in draft form for review and comments within ten months of the effective date of this lease. LESSEE shall give LESSOR reasonable notice of the application for and receipt of any state, federal or local permits as well as any public hearings or meetings relating to the development or use of the leased premises. LESSEE shall not proceed with development of said

leased premises including, but not limited to, funding, permit applications, design or building contracts until the Management Plan required herein has been submitted and approved. Any financial commitments made by LESSEE which are not in compliance with the terms of this lease shall be done at LESSEE'S own risk. The Management Plan shall emphasize the original management concept as approved by LESSOR at the time of acquisition which established the primary public purpose for which the leased premises were acquired. The approved Management Plan shall provide the basic guidance for all management activities and shall be reviewed jointly by LESSEE and LESSOR at least every five years. LESSEE shall not use or alter the leased premises except as provided for in the approved Management Plan without the prior written approval of LESSOR. The Management Plan prepared under this lease shall identify management strategies for exotic species, if present. The introduction of exotic species is prohibited, except when specifically authorized by the approved Management Plan.

9. EASEMENTS: All easements including, but not limited to, utility easements are expressly prohibited without the prior written approval of LESSOR. Any easement not approved in writing by LESSOR shall be void and without legal effect.

10. SUBLEASES: This lease is for the purposes specified herein and subleases of any nature are prohibited without the prior written approval of LESSOR, which approval shall not be unreasonably withheld. Any sublease not approved in writing by LESSOR shall be void and without legal effect.

11. RIGHT OF INSPECTION: LESSOR or its duly authorized agents, representatives or employees shall have the right to reasonably inspect the leased premises and the works and operations of LESSEE in any matter pertaining to this lease.

12. PLACEMENT AND REMOVAL OF IMPROVEMENTS: All buildings, structures and improvements shall be constructed in accordance

deemed to have been made unless the waiver is set forth in writing, signed by LESSOR.

17. TIME: Time is expressly declared to be of the essence of this lease.

18. NON-DISCRIMINATION: LESSEE shall not discriminate against any individual because of that individual's race, color, religion, sex, national origin, age, handicap, or marital status with respect to any activity occurring within the leased premises or upon lands adjacent to and used as an adjunct of the leased premises.

19. UTILITY FEES: LESSEE shall be responsible for the payment of all charges for the furnishing of gas, electricity, water and other public utilities to the leased premises and for having the utilities turned off when the leased premises are surrendered.

20. MINERAL RIGHTS: This lease does not cover petroleum or petroleum products or minerals and does not give the right to LESSEE to drill for or develop the same.

21. RIGHT OF AUDIT: LESSEE shall make available to LESSOR all financial and other records relating to this lease, and LESSOR shall have the right to audit such records at any reasonable time during the term of this lease. This right shall be continuous until this lease expires or is terminated. This lease may be terminated by LESSOR should LESSEE fail to allow public access to all documents, papers, letters or other materials made or received in conjunction with this lease, pursuant to the provisions of Chapter 119, Florida Statutes.

22. CONDITION OF PREMISES: LESSOR assumes no liability or obligation to LESSEE with reference to the conditions of the leased premises. The leased premises herein are leased by LESSOR to LESSEE in an "as is" condition, with LESSOR assuming no responsibility for the care, repair, maintenance or improvement of the leased premises for the benefit of LESSEE.

23. COMPLIANCE WITH LAWS: LESSEE agrees that this lease is contingent upon and subject to LESSEE obtaining all applicable permits and complying with all applicable permits, regulations, ordinances, rules, and laws of the State of Florida or the United States or of any political subdivision or agency of either.

24. NOTICE: All notices given under this lease shall be in writing and shall be served by certified mail including, but not limited to, notice of any violation served pursuant to Section 253.04, Florida Statutes, to the last address of the party to whom notice is to be given, as designated by such party in writing. LESSOR and LESSEE hereby designate their address as follows:

LESSOR: Department of Environmental Protection
Division of State Lands
Bureau of Public Land Administration, M. S. 130
3900 Commonwealth Boulevard,
Tallahassee, Florida 32399-3000

LESSEE: County of Volusia
County Manager
123 W. Indiana Avenue
DeLand, Florida 32720

25. BREACH OF COVENANTS, TERMS, OR CONDITIONS: Should LESSEE breach any of the covenants, terms, or conditions of this lease, LESSOR shall give written notice to LESSEE to remedy such breach within sixty days of such notice. In the event LESSEE fails to remedy the breach to the satisfaction of LESSOR within sixty days of receipt of written notice, LESSOR may either terminate this lease and recover from LESSEE all damages LESSOR may incur by reason of the breach including, but not limited to, the cost of recovering the leased premises and attorneys' fees or maintain this lease in full force and effect and exercise all rights and remedies herein conferred upon LESSOR.

26. DAMAGE TO THE PREMISES: (a) LESSEE shall not do, or suffer to be done, in, on or upon the leased premises or as affecting said leased premises or adjacent properties, any act which may

result in damage or depreciation of value to the leased premises or adjacent properties, or any part thereof. (b) LESSEE shall not generate, store, produce, place, treat, release or discharge any contaminants, pollutants, or pollution, including, but not limited to, hazardous or toxic substances, chemicals or other agents on, into, or from the leased premises or any adjacent lands or waters in any manner not permitted by law. For the purposes of this lease, "hazardous substances" shall mean and include those elements or compounds defined in 42 USC Section 9601 or which are contained in the list of hazardous substances adopted by the United States Environmental Protection Agency (EPA) and the list of toxic pollutants designated by the United States Congress or the EPA or defined by any other federal, state or local statute, law, ordinance, code, rule, regulation, order or decree regulating, relating to, or imposing liability or standards of conduct concerning any hazardous, toxic or dangerous waste, substance, material, pollutant or contaminant.

"Pollutants" and "pollution" shall mean those products or substances defined in Chapters 376 and 403, Florida Statutes, and the rules promulgated thereunder, all as amended or updated from time to time. In the event of LESSEE's failure to comply with this paragraph, LESSEE shall, at its sole cost and expense, promptly commence and diligently pursue any legally required closure, investigation, assessment, cleanup, decontamination, remediation, restoration and monitoring of (1) the leased premises, and (2) all off-site ground and surface waters and lands affected by LESSEE's such failure to comply, as may be necessary to bring the leased premises and affected off-site waters and lands into full compliance with all applicable federal, state or local statutes, laws, ordinances, codes, rules, regulations, orders and decrees, and to restore the damaged property to the condition existing immediately prior to the occurrence which caused the damage. LESSEE'S obligations set

forth in this paragraph shall survive the termination or expiration of this lease. This paragraph shall not be construed as a limitation upon LESSEE'S obligations as set forth in paragraph 14 of this lease, nor upon any other obligations or responsibilities of LESSEE as set forth herein. Nothing herein shall relieve LESSEE of any responsibility or liability prescribed by law for fines, penalties and damages levied by governmental agencies, and the cost of cleaning up any contamination caused directly or indirectly by LESSEE'S activities or facilities. Upon discovery of a release of a hazardous substance or pollutant, or any other violation of local, state or federal law, ordinance, code, rule, regulation, order or decree relating to the generation, storage, production, placement, treatment, release or discharge of any contaminant, LESSEE shall report such violation to all applicable governmental agencies having jurisdiction, and to LESSOR, all within the reporting periods of the applicable governmental agencies. This paragraph shall not be deemed to apply to any conditions existing prior to the effective date of this lease.

27. ENVIRONMENTAL AUDIT: At LESSOR'S discretion, LESSEE shall provide LESSOR with a current Phase I environmental site assessment conducted in accordance with the Department of Environmental Protection, Division of State Land's standards prior to termination of this lease, and if necessary a Phase II environmental site assessment.

28. SURRENDER OF PREMISES: Upon termination or expiration of this lease, LESSEE shall surrender the leased premises to LESSOR. In the event no further use of the leased premises or any part thereof is needed, LESSEE shall give written notification to the Bureau of Public Land Administration, Division of State Lands, Department of Environmental Protection, Mail Station 130, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399-3000, at least six months prior to the release of any or all of the leased

premises. Notification shall include a legal description, this lease number, and an explanation of the release. The release shall only be valid if approved by LESSOR through the execution of a release of lease instrument with the same formality as this lease. Upon release of all or any part of the leased premises or upon termination or expiration of this lease, all permanent/capital improvements, including both physical structures and modifications to the leased premises, shall become the property of LESSOR, unless LESSOR gives written notice to LESSEE to remove any or all such improvements at the expense of LESSEE. The decision to retain any improvements upon termination of this lease shall be at LESSOR'S sole discretion. Prior to surrender of all or any part of the leased premises a representative of the Division of State Lands, Department of Environmental Protection, shall perform an on-site inspection and the keys to any building on the leased premises shall be turned over to the Division.

29. BEST MANAGEMENT PRACTICES: LESSEE shall implement applicable Best Management Practices for all activities conducted under this lease in compliance with paragraph 18-2.018(2)(h), Florida Administrative Code, which have been selected, developed, or approved by LESSOR, LESSEE or other land managing agencies for the protection and enhancement of the leased premises.

30. PUBLIC LANDS ARTHROPOD CONTROL PLAN: LESSEE shall identify and subsequently designate to the respective arthropod control district or districts within one year of the effective date of this lease all of the environmentally sensitive and biologically highly productive lands contained within the leased premises, in accordance with Section 388.4111, Florida Statutes and Chapter 5E-13, Florida Administrative Code, for the purpose of obtaining a public lands arthropod control plan for such lands.

31. PROHIBITIONS AGAINST LIENS OR OTHER ENCUMBRANCES: Fee title to the leased premises is held by LESSOR. LESSEE shall not do or

permit anything to be done which purports to create a lien or encumbrance of any nature against the real property contained in the leased premises including, but not limited to, mortgages or construction liens against the leased premises or against any interest of LESSOR therein.

32. PARTIAL INVALIDITY: If any term, covenant, condition or provision of this lease shall be ruled by a court of competent jurisdiction to be invalid, void, or unenforceable, the remainder of the provisions shall remain in full force and effect and shall in no way be affected, impaired or invalidated.

33. ARCHAEOLOGICAL AND HISTORIC SITES: Execution of this lease in no way affects any of the parties' obligations pursuant to Chapter 267, Florida Statutes. The collection of artifacts or the disturbance of archaeological and historic sites on state-owned lands is prohibited unless prior authorization has been obtained from the Department of State, Division of Historical Resources. The Management Plan prepared pursuant to Chapters 18-2 and 18-4, Florida Administrative Code, shall be reviewed by the Division of Historical Resources to insure that adequate measures have been planned to locate, identify, protect and preserve the archaeological and historic sites and properties on the leased premises.

34. SOVEREIGNTY SUBMERGED LANDS: This lease does not authorize the use of any lands located waterward of the mean or ordinary high water line of any lake, river, stream, creek, bay, estuary, or other water body or the waters or the air space thereabove.

35. ENTIRE UNDERSTANDING: This lease sets forth the entire understanding between the parties and shall only be amended with the prior written approval of LESSOR.

36. MAINTENANCE OF IMPROVEMENTS: LESSEE shall maintain the real property contained within the leased premises and the improvements located thereon, in a state of good condition, working order and repair including, but not limited to, keeping

the leased premises free of trash or litter, meeting all building and safety codes for the location situated, maintaining the planned improvements as set forth in the approved Management Plan and maintaining any and all existing roads, canals, ditches, culverts, risers and the like in as good condition as the same may be on the effective date of this lease, reasonable wear and tear excepted; provided, however, that any removal, closure, etc, of the above improvements shall be acceptable when the proposed activity is consistent with the goals of conservation, protection, enhancement, or safety of the natural and historical resources within the leased premises and with the approved Management Plan.

37. GOVERNING LAW: This lease shall be governed by and interpreted according to the laws of the State of Florida.

38. SIGNS: LESSEE shall ensure that the area is identified as being publicly owned and operated as a public facility in all signs, literature and advertising. If federal grants or funds are used by LESSEE for any project on the leased premises LESSEE shall erect signs identifying the leased premises as a federally assisted project.

39. SECTION CAPTIONS: Articles, subsections and other captions contained in this lease are for reference purposes only and are in no way intended to describe, interpret, define or limit the scope, extent or intent of this lease or any provisions thereof.

40. ADMINISTRATIVE FEE: LESSEE shall pay LESSOR an annual administrative fee of \$300. The initial annual administrative fee shall be payable within thirty days from the date of execution of this lease agreement and shall be prorated based on the number of months or fraction thereof remaining in the fiscal year of execution. For purposes of this lease agreement, the fiscal year shall be the period extending from July 1 to June 30. Each annual payment thereafter shall be due and payable on July 1 of each subsequent year.

IN WITNESS WHEREOF, the parties have caused this lease to be executed on the day and year first above written.

BOARD OF TRUSTEES OF THE INTERNAL
IMPROVEMENT TRUST FUND OF THE
STATE OF FLORIDA

Refisse Hark
Witness
Belissa Vickers
Print/Type Witness Name

Judy Woodard
Witness
Judy Woodard
Print/Type Witness Name

By: Gloria C. Nelson (SEAL)
GLORIA C. NELSON, OPERATIONS
AND MANAGEMENT CONSULTANT
MANAGER, BUREAU OF PUBLIC LAND
ADMINISTRATION, DIVISION OF
STATE LANDS, DEPARTMENT OF
ENVIRONMENTAL PROTECTION

"LESSOR"

STATE OF FLORIDA
COUNTY OF LEON

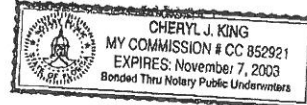
The foregoing instrument was acknowledged before me this
12th day of January 2001, by Gloria C. Nelson, as
Operations and Management Consultant Manager, Bureau of Public
Land Administration, Division of State Lands, Department of
Environmental Protection, as agent for and on behalf of the Board
of Trustees of the Internal Improvement Trust Fund of the State
of Florida, who is personally known to me.

Cheryl J. King
Notary Public, State of Florida

Print/Type Notary Name

Commission Number:

Commission Expires:



Approved as to
Form and Legality

By: Raymond
DEP Attorney

COUNTY OF VOLUSIA, FLORIDA
BY ITS COUNTY COUNCIL

Diane Tyler
Witness
Diane Tyler
Print/Type Name
Jessica Cortes
Witness
Jessica Cortes
Print/Type Name

By: James E. Ward
James E. Ward
Print/Type Name
Title: Chair

OFFICIAL SEAL


ATTEST: Ray Pennebaker
County Manager/Clerk
County Council of Volusia
County

"LESSEE"

STATE OF FLORIDA
COUNTY OF VOLUSIA

The foregoing instrument was acknowledged before me this
14th day of December 2000, by JAMES E. WARD, and
RAY W. PENNEBAKER as Chair
and Chief Operating Officer, respectively, on behalf of the
County Council of Volusia County. They are personally known to
me.

(SEAL)

 Susan M. Whittaker
My Commission CC754321
Expires August 8, 2002

Susan M. Whittaker
Notary Public, State of Florida

SUSAN M. WHITTAKER
Print/Type Notary Name
SUSAN M. WHITTAKER
Commission Number: CC754321
Commission Expires: 8/8/02

Warranty Deed

EXHIBIT "A"
LEGAL DESCRIPTION

2051237

BOOK PAGE
VOLUSIA COUNTY

This Indenture, Made this 25th day of April 1986, Between

COUNTY OF VOLUSIA, a Political Subdivision of the State of Florida

of the County of Volusia, State of Florida, grantor, and

STATE OF FLORIDA, BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND

whose post office address is

of the County of Volusia, State of Florida, grantee.

Witnesseth, That said grantor, for and in consideration of the sum of

— TEN AND NO/100THS —

Dollars,

and other good and valuable considerations to said grantor in hand paid by said grantee, the receipt whereof is hereby acknowledged, has granted, bargained and sold to the said grantee, and grantee's heirs and assigns forever, the following described land, situate, lying and being in Volusia County, Florida, to-wit:

(SEE ATTACHED LEGAL DESCRIPTION WHICH IS MARKED
EXHIBIT "A" AND MADE A PART HEREOF.)

FILED FOR RECORD
RECORD VERIFIED
MAY 2 12 39 PM '86
048925

and said grantor does hereby fully warrant the title to said land, and will defend the same against the lawful claims of all persons whomsoever.

* "Grantor" and "grantee" are used for singular or plural, as context requires

In Witness Whereof, Grantor has hereunto set grantor's hand and seal the day and year first above written.
Signed, sealed and delivered in our presence:

James C. Butler

Thomas C. Kelly

Thomas C. Kelly

Thomas C. Kelly

STATE OF FLORIDA

COUNTY OF VOLUSIA

COUNTY OF VOLUSIA, a Political Subdivision of
the State of Florida
BY: James C. Kelly (Seal)
JAMES C. KELLY, Chairman of Volusia County Council

Attest: Thomas C. Kelly (Seal)
Thomas C. Kelly, County Manager/Clerk
EX OFFICIO

I HEREBY CERTIFY that on this day before me, an officer duly qualified to take acknowledgments, personally appeared JAMES C. KELLY, Chairman of Volusia County Council and THOMAS C. KELLY, County Manager/Clerk of Volusia County, a Political Subdivision of the State of Florida, to me known to be the person(s) described in and who executed the foregoing instrument and acknowledged before me that they executed the same.

WITNESS my hand and official seal in the County and State last aforesaid this 25th day of April 1986

My commission expires:

Notary Public, State of Florida at Large
My Commission Expires September 25, 1988

Page 15 of 24
Lease No. 4195

Revised 09/12/00

The South $\frac{1}{4}$ of the Southeast $\frac{1}{4}$, together with the Southerly 99.90 feet of the Northwest $\frac{1}{4}$ of the Southeast $\frac{1}{4}$, all in Section 33, Township 16 South, Range 33 East, Volusia County, Florida.

Also a portion of Sections 3 and 4, Township 17 South, Range 33 East, Volusia County, Florida, described as follows:

From the Northeast corner of said Section 4, run South 89 Degrees 08 Minutes 30 Seconds West along the North line of said Section 4 a distance of 506.98 feet to the Point of Beginning of the centerline of a 60 foot access and utility easement, being 30.00 feet on each side of the following described centerline; thence South 01 Degrees 07 Minutes 00 Seconds West, parallel, with the East line of said Section 4 a distance of 1839.26 feet to the P.C. of a curve, concave Northeast, having a radius of 673.00 feet and a central angle of 54 Degrees 31 Minutes 26 Seconds; thence run Southerly along the arc of said curve a distance of 642.34 feet; thence South 33 Degrees 24 Minutes 26 Seconds East a distance of 350.00 feet to the centerline of Turnbull Bay Road and the termination of said centerline.

SUBJECT to Right of Way Easement in Deed Book 290, Page 545, Public Records of Volusia County, Florida.

SUBJECT to Florida Power & Light Easement recorded in Deed Book 199, Page 186, Public Records of Volusia County, Florida.

SUBJECT to certain boundary line agreement between Darrell S. Olier and Catherine C. Goodrich, recorded in Official Records Book 1892, Page 1727, Public Records of Volusia County, Florida.

SUBJECT to Right of Way in favor of Florida Gas Company, as recorded in Official Records Book 379, Page 683, Public Records of Volusia County, Florida.

SUBJECT to Right of Way of Martin Dairy Road.

SUBJECT to matters contained in that Special Warranty Deed from Berrien Becks, Sr. and Berrien Becks, Jr. to E. H. Cates, Jr., as recorded in Official Records Book 2782, Page 462, Public Records of Volusia County, Florida.

Please Return to:
Brian Wood
East Florida Title Services, Inc.
138 W. New York Ave.
Orlando, FL 32720

COUNTY DEED

THIS DEED, MADE THIS 19TH DAY OF FEBRUARY, 1998, by the COUNTY OF VOLUSIA, a political subdivision of the State of Florida, GRANTOR, to the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA, whose mailing address is c/o Florida Department of Environmental Protection, 3900 Commonwealth Boulevard, Mail Station 115, Tallahassee, FL 32399-3000, GRANTEE;

WITNESSETH:

That said Grantor for and in consideration of the sum of Ten Dollars (\$10.00) and other good and valuable considerations to said Grantor in hand paid by said Grantee, the receipt whereof is hereby acknowledged, has granted, bargained and sold to said Grantee, its successors and assigns forever, all of its interest in the following described land, situate, lying and being in Volusia County, Florida, to-wit:

(See SCHEDULE "A" attached hereto for Legal Description)
Property Appraiser's Parcel Identification No. 6323-00-00-0010

IN WITNESS WHEREOF, the GRANTOR has caused these presents to be executed in its name by its County Council acting by the Chairman of said Council, and its seal affixed on the day and year first above written.

(OFFICIAL SEAL)

COUNTY COUNCIL
VOLUSIA COUNTY, FLORIDA

BY: [Signature]
R. STANLEY ROSE, Chair

ATTEST: Lawrence W. Arrington
Lawrence W. Arrington, County Manager.

This Instrument Prepared by:

COUNTY OF VOLUSIA
123 W. Indigo Avenue
DeLand, Florida 32721-4613
ATTN: Daniel D. Eckert
1.4.2014/10.00

Approved for Closing
By: W. Robinson
DEP Attorney
Date: 2-19-98

EXHIBIT "A"

PARCEL NUMBER 1

THAT PART OF U.S. LOTS 1 AND 3, SECTION 23, TOWNSHIP 16 SOUTH, RANGE 33 EAST, LYING WEST OF U.S. HIGHWAY NO. 1, U.S. LOT 2, SECTION 23, TOWNSHIP 16 SOUTH, RANGE 33 EAST, U.S. LOTS 1, 4 AND 5, SECTION 22, TOWNSHIP 16 SOUTH, RANGE 33 EAST. THAT PART OF U.S. LOTS 2 AND 3, SECTION 22, TOWNSHIP 16 SOUTH, RANGE 33 EAST LYING EAST OF FLORIDA EAST COAST RAILWAY. THAT PART OF THE NORTHWEST 1/4 OF SECTION 22, TOWNSHIP 16 SOUTH, RANGE 33 EAST, LYING EAST OF THE FLORIDA EAST COAST RAILWAY. EXCEPTING THEREFROM THE FOLLOWING DESCRIBED PROPERTY IN LOT 1, SECTION 23, TOWNSHIP 16 SOUTH, RANGE 33 EAST: BEGIN AT A POINT ON THE WEST BOUNDARY OF U.S. NO. 1 HIGHWAY, WHERE THE SAME IS INTERSECTED BY THE SOUTHERLY SHORE OF ROSE BAY AT HIGHWATER MARK, THENCE SOUTHERLY ALONG THE WEST BOUNDARY OF SAID HIGHWAY 295.11 FEET, THENCE WESTERLY AND AT RIGHT ANGLES TO SAID HIGHWAY 295.11 FEET TO A CONCRETE MONUMENT, THENCE NORTHWESTERLY AND PARALLEL TO SAID HIGHWAY 295.11 FEET TO A POINT IN ROSE BAY, THENCE 295.11 FEET TO THE POINT OF BEGINNING, EXCEPT THAT PART NOW IN HIGHWAY NO. 1.

PARCEL NUMBER 9

PARCEL "A" - OFFICIAL RECORDS BOOK 2433, PAGE 333, PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA; SECTION 28, TOWNSHIP 16 SOUTH, RANGE 33 EAST; SOUTHWEST 1/4 OF NORTHWEST 1/4 LYING SOUTH AND WEST OF CREEK, SECTION 29, TOWNSHIP 16 SOUTH, RANGE 33 EAST; NORTHEAST 1/4 SOUTH OF SPRUCE CREEK, ALL LOCATED IN VOLUSIA COUNTY, FLORIDA, EXCEPTING THEREFROM PARCEL "B" OF OFFICIAL RECORDS BOOK 1274, PAGE 552, PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA: THAT PART OF: SOUTHWEST 1/4 OF NORTHEAST 1/4, SOUTH OF SPRUCE CREEK, OF SECTION 29, TOWNSHIP 16 SOUTH, RANGE 33 EAST, LYING WESTERLY OF A LINE DESCRIBED AS FOLLOWS: COMMENCE ON THE SOUTH BOUNDARY OF SECTION 29, TOWNSHIP 16 SOUTH, RANGE 33 EAST AT A POINT 1492.50 FEET WEST FROM THE SOUTHEAST CORNER THEREOF, RUN THENCE NORTH 23 DEGREES 23 MINUTES 50 SECONDS WEST, 2244.80 FEET; THENCE NORTH 66 DEGREES 36 MINUTES 10 SECONDS EAST, 250 FEET TO THE POINT OF BEGINNING; RUN THENCE NORTH 13 DEGREES 36 MINUTES 19 SECONDS EAST, 1770 FEET, MORE OR LESS, TO THE MIDDLE OF SPRUCE CREEK, AND THE END OF THE LINE AS HEREIN DESCRIBED.

PARCEL NUMBER 4

THE PALMAS GRANT ALSO KNOWN AS SECTION 38, TOWNSHIP 16 SOUTH, RANGE 33 EAST, EXCEPTING THEREFROM THE FOLLOWING PARTS: LOT 8 IN BLOCK 11; THAT PART OF LOTS 1 AND 2 IN BLOCK 13, LYING EAST OF WHAT IS COMMONLY KNOWN AS THE SAW GRASS MARSH; LOTS 1 AND 2 AND 3, IN BLOCK 14; AND THE WEST 1/2 OF LOT 1 IN BLOCK 13; AND THAT PARCEL OF LAND HERETOFORE CONVEYED TO THE FLORIDA EAST COAST AND GULF RAILROAD CO., (NOW OWNED BY THE FLORIDA EAST COAST RAILROAD) ON OCTOBER 5, 1892, SAID EXCEPTED TRACTS AND THE BLOCKS AND LOTS ABOVE NAMED ARE KNOWN AS LOTS AND BLOCKS IN A PLAT OF THE PALMAS GRANT RECORDED IN MAP BOOK 1, PAGE 23, OF THE PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA, AND ALSO EXCEPTING THEREFROM A PORTION OF THE PALMAS GRANT, KNOWN AS THAT PORTION OF LOT OR BLOCK 24, CONNERAT'S SUBDIVISION OF SAID PALMAS GRANT, BEING MORE PARTICULARLY DESCRIBED AS BEGINNING AT A POINT IN THE WEST LINE OF U.S. HIGHWAY NO. 1, ALSO KNOWN AS DIXIE HIGHWAY AND BEING 200 FEET WIDE AS NOW LAID OUT AND OCCUPIED; SAID POINT BEING A DISTANCE OF 1960 FEET SOUTHERLY

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PAGE 1 OF 4

EXHIBIT "A" (CONTINUED)

OF, AS MEASURED AT RIGHT ANGLES, TO THE NORTH LINE OF SAID PALMAS GRANT; THENCE SOUTH 14 DEGREES 40 MINUTES 30 SECONDS EAST ALONG SAID WEST LINE OF U.S. HIGHWAY NO. 1 (DIXIE HIGHWAY) A DISTANCE OF 250 FEET TO A POINT THEREIN; THENCE SOUTH 60 DEGREES 00 MINUTES 00 SECONDS WEST, A DISTANCE OF 161 FEET MORE OR LESS TO A HIGH WATER MARK OF SPRUCE CREEK; THENCE NORTHERLY ALONG SAID HIGH WATER MARK A DISTANCE OF 275 FEET MORE OR LESS, TO A POINT IN A LINE PARALLEL TO AND 1960 FEET SOUTHERLY AS MEASURED AT RIGHT ANGLES, FROM SAID NORTH LINE OF PALMAS GRANT; THENCE NORTH 60 DEGREES EAST, ALONG SAID PARALLEL LINE A DISTANCE OF 100 MORE OR LESS TO A POINT OF BEGINNING AND ALSO EXCEPTING THEREFROM THAT CERTAIN 10 ACRES OF THE PLOT KNOWN AS "BLACK HAMMOCK", WHICH 10 ACRES ARE BOUNDED ON THE EAST BY THE HIGHWAY OR ROAD WHICH RUNS FROM NEW SMYRNA TO DAYTONA, ON THE NORTH BY SAME HIGHWAY AND BY SPRUCE CREEK, ON THE WEST BY SPRUCE CREEK AND TURNBULL BAY, AND ON THE SOUTH BY OTHER LAND OF PALMAS GRANT. ALSO EXCEPTING THEREFROM THE RIGHT OF WAY OF U.S. HIGHWAY NO. 1 AS NOW LAID OUT AND ESTABLISHED. ALSO EXCEPTING ALL LAND EAST OF U.S. HIGHWAY NO. 1; ALSO EXCEPTING ALL LAND WEST OF THE FLORIDA EAST COAST RAILROAD NORTH OF SPRUCE CREEK AND ALSO EXCEPTING ALL LAND SOUTH OF SPRUCE CREEK EAST OF TURNBULL BAY ALL OF SAID LAND WITHIN THE PALMAS GRANT.

AND ALSO EXCEPTING:

A PORTION OF BLOCKS 24 AND 25, LYING WESTERLY OF U.S. HIGHWAY NO. 1, A 160 FOOT RIGHT OF WAY, PALMAS GRANT SUBDIVISION AS RECORDED IN MAP BOOK 1, PAGE 22, OF THE PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA; AND A PORTION OF GOVERNMENT LOT 3, SECTION 23, TOWNSHIP 16 SOUTH, RANGE 33 EAST AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCE AT THE NORTHEAST CORNER OF THE SAID PALMAS GRANT PER DEPARTMENT OF TRANSPORTATION RIGHT OF WAY MAPS. THENCE S 59°12'38" W, ALONG THE NORTH LINE OF SAID PALMAS GRANT, 710.79 FEET TO THE NORTHWESTERLY RIGHT OF WAY LINE OF U.S. HIGHWAY NO. 1 SAID POINT BEING N 59°12'38" E, .7 FEET FROM A FOUND CONCRETE MONUMENT ON THE SAID PALMAS GRANT LINE. THENCE S 01°05'04" W, ALONG THE WESTERLY RIGHT OF WAY LINE OF SAID U.S. HIGHWAY NO. 1, 449.03 FEET TO THE POINT OF BEGINNING; THENCE CONTINUE S 01°05'04" W, 754.86 FEET; THENCE ALONG A WETLANDS LINE AS LOCATED BY THE VOLUSIA COUNTY ENVIRONMENTAL DEPARTMENT THE FOLLOWING COURSES AND DISTANCES: N 51°14'31" W, 59.41 FEET; THENCE N 09°48'24" E, 22.34 FEET; THENCE N 08°24'49" W, 17.09 FEET; THENCE N 37°27'10" W, 39.89 FEET; THENCE N 17°34'37" E, 54.43 FEET; THENCE N 77°59'03" E, 18.65 FEET; THENCE N 12°41'49" E, 46.89 FEET; THENCE N 20°33'31" W, 36.92 FEET; THENCE N 03°11'47" E, 69.28 FEET; THENCE N 11°00'57" W, 50.82 FEET; THENCE N 28°37'59" W, 53.34 FEET; THENCE N 46°02'53" E, 36.86 FEET; THENCE N 85°35'44" W 34.46 FEET; THENCE S 52°06'38" W, 45.03 FEET; THENCE N 41°22'23" W, 55.36 FEET; THENCE S 03°44'33" W, 72.99 FEET; THENCE S 68°27'07" W, 77.06 FEET; THENCE S 05°23'34" E, 41.28 FEET; THENCE S 45°01'49" E, 47.46 FEET; THENCE S 14°22'22" W, 54.49 FEET; THENCE S 01°53'25" E, 54.31 FEET; THENCE S 21°01'39" E, 44.62 FEET; THENCE S 00°26'23" E, 70.32 FEET; THENCE S 54°00'46" W, 43.72 FEET; THENCE S 34°19'15" W, 83.75 FEET; THENCE S 14°14'25" E, 34.71 FEET; THENCE S 18°33'42" W, 38.56 FEET; THENCE S 09°34'15" E, 72.08 FEET; THENCE S 40°23'55" E, 25.89 FEET; THENCE S 52°41'29" W, 57.61 FEET; THENCE S 72°58'04" W, 41.55 FEET; THENCE S 09°45'32" E 30.10 FEET; THENCE S 33°03'22" E, 35.36 FEET; THENCE S 25°03'54" W, 26.72 FEET; THENCE S 73°21'26" W, 47.51 FEET; THENCE N 79°12'06" W 53.11 FEET; THENCE S 32°05'01" W, 27.61 FEET; THENCE S 72°11'00" E, 39.93 FEET; THENCE S 23°39'57" E, 45.33 FEET; THENCE S 18°24'28" W, 34.01 FEET; THENCE S 81°35'48" W, 64.17 FEET; THENCE N 77°54'30" W, 33.29 FEET; THENCE S 67°23'25" W, 34.67 FEET; THENCE N 65°47'33" W, 62.75 FEET; THENCE N 74°10'59" W, 38.19 FEET;

SPRUCE CREEK/VOLUSIA COUNTY
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EXHIBIT "A" (CONTINUED)

THENCE N 09°29'55" W, 48.18 FEET; THENCE N 40°34'52" W, 32.80 FEET; THENCE N 40°55'44" W, 66.27 FEET; THENCE N 53°56'08" W, 61.80 FEET; THENCE N 26°30'18" W, 39.47 FEET; THENCE N 32°50'55" W, 48.11 FEET; THENCE N 34°55'30" W, 169.43 FEET; THENCE N 33°41'58" W, 92.53 FEET; THENCE N 40°04'03" W, 45.87 FEET; THENCE N 52°05'17" W, 51.41 FEET; THENCE N 18°02'44" W, 35.37 FEET; THENCE N 09°15'08" E, 69.20 FEET; THENCE N 08°50'07" E, 53.18 FEET; THENCE N 03°00'10" E, 43.53 FEET; THENCE N 38°48'46" E, 36.62 FEET; THENCE N 06°45'33" E, 70.01 FEET; THENCE N 25°11'18" W, 77.84 FEET; THENCE N 00°54'51" W, 79.72 FEET; THENCE N 01°17'24" W, 62.60 FEET; TO THE SAID NORTH LINE OF THE PALMAS GRANT; THENCE N 01°17'24" W, 13.25 FEET; THENCE N 24°09'52" W, 60.85 FEET; THENCE N 02°18'43" E, 62.79 FEET; THENCE N 07°11'38" W, 33.53 FEET; THENCE N 18°56'19" E, 32.93 FEET; THENCE N 12°05'34" W, 37.91 FEET; THENCE N 16°45'13" E, 56.50 FEET; THENCE N 10°07'15" E, 53.71 FEET; THENCE N 46°29'56" E, 26.76 FEET; THENCE S 65°53'18" E, 62.66 FEET; THENCE N 33°32'20" E, 45.23 FEET; THENCE N 39°56'09" E, 48.85 FEET; THENCE N 62°37'18" E, 44.19 FEET; THENCE N 80°12'52" E, 33.29 FEET; THENCE S 78°10'31" E, 36.77 FEET; THENCE S 34°19'53" E, 30.02 FEET; THENCE S 58°09'16" E, 61.04 FEET; THENCE S 40°21'37" W, 53.72 FEET; THENCE S 69°47'21" W, 40.74 FEET; THENCE S 07°54'59" W, 31.08 FEET; THENCE S 21°50'13" E, 51.40 FEET; THENCE S 79°38'15" E, 48.81 FEET; THENCE S 24°54'01" E, 25.92 FEET; TO THE SAID NORTH LINE OF THE PALMAS GRANT; THENCE S 24°54'01" E, 20.73 FEET; THENCE S 43°30'03" W, 28.00 FEET; THENCE N 80°23'56" E, 47.00 FEET; THENCE S 65°15'45" E, 38.00 FEET; THENCE S 75°33'57" E, 45.98 FEET; THENCE N 77°57'27" E, 33.70 FEET; THENCE S 86°51'24" E, 62.12 FEET; THENCE N 71°07'43" E, 37.53 FEET; THENCE N 61°38'46" E, 122.13 FEET; THENCE S 79°56'05" E, 35.51 FEET; THENCE S 57°34'43" E, 49.71 FEET; THENCE S 45°09'18" E, 85.20 FEET; THENCE N 80°37'21" E, 45.34 FEET; THENCE S 47°04'29" E, 42.68 FEET; THENCE S 02°52'05" E, 31.14 FEET; THENCE S 11°31'02" W, 48.19 FEET; THENCE S 88°53'30" E, 54.10 FEET; THENCE N 44°43'50" E, 42.64 FEET; THENCE N 06°03'48" E, 47.80 FEET; THENCE N 23°34'06" E, 63.12 FEET TO THE POINT OF BEGINNING.

AND ALSO EXCEPTING

A PORTION OF SAID PALMAS GRANT BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCE AT THE SOUTHWEST CORNER OF THE PALMAS GRANT, RUN ALONG THE SOUTHERLY LINE OF SAID PALMAS GRANT, N 60°34'28" E, 631.90 FEET TO THE POINT OF BEGINNING; THENCE N 14°03'22" W, 1354.64 FEET; THENCE N 30°01'19" W, 673.31 FEET; THENCE S 60°34'28" W, 40.01 FEET; TO THE SOUTHEAST CORNER OF LOT 2, BLOCK 13, SAID PALMAS GRANT; THENCE ALONG THE EASTERLY LINE OF LOTS 1 AND 2, SAID BLOCK 13, N 30°45'33" W, 330.00 FEET; THENCE N 60°34'28" E, 100.03 FEET; THENCE S 30°45'33" E, 328.99 FEET; THENCE S 30°01'19" E, 627.45 FEET; TO THE WESTERLY RIGHT OF WAY LINE OF THE FLORIDA EAST COAST RAILWAY; THENCE ALONG SAID RIGHT OF WAY, S 21°32'42" E, 115.35 FEET; THENCE S 14°03'22" E, 1284.75 FEET; TO THE SAID SOUTHERLY LINE OF THE PALMAS GRANT; THENCE ALONG SAID SOUTHERLY LINE S 60°34'28" W, 62.23 FEET, TO THE POINT OF BEGINNING.

AND ALSO EXCEPTING;

A PORTION OF SAID PALMAS GRANT BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCE AT THE SOUTHWEST CORNER OF THE PALMAS GRANT, RUN N 07°39'56" W, 2841.78 FEET, TO A POINT ON THE NORTHERLY LINE OF LOT 8, BLOCK 8 OF SAID PALMAS GRANT, BEING THE POINT OF BEGINNING; THENCE ALONG SAID NORTHERLY LINE OF LOT 8, S 60°34'28" W, 70.00 FEET TO THE SOUTHEAST CORNER OF LOT 3, BLOCK 14, OF SAID PALMAS GRANT; THENCE ALONG THE EASTERLY LINE OF SAID LOT 3, N 29°18'53" W,

STANLEY CREEK/VOLUNTA COUNTY
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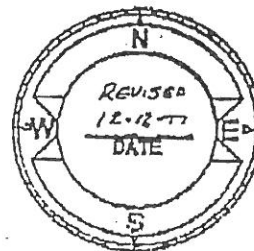
EXHIBIT "A" (CONTINUED)

711.25 FEET TO THE MEAN HIGH WATER LINE OF SPRUCE CREEK; THENCE ALONG SAID MEAN HIGH WATER LINE THE FOLLOWING TWO COURSES AND DISTANCES (1) S 58°22'46" E, 86.97 FEET, (2) N 78°31'25" E, 29.15 FEET; THENCE S 29°18'53" E, 626.30 FEET; TO THE POINT OF BEGINNING.

PARCEL 3:

A PORTION OF BLOCKS 24 AND 25 AND A PORTION OF A VACATED 30 FOOT RIGHT OF WAY UNOPENED AND UNUSED LYING BETWEEN BLOCKS 24 AND 25, PALMAS GRANT SUBDIVISION OF SECTION 38, TOWNSHIP 16 SOUTH, RANGE 33 EAST, AS SHOWN IN MAP BOOK 1, PAGE 23 OF THE PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA, LYING EAST OF U.S. HIGHWAY #1, (160 FOOT RIGHT OF WAY AS NOW OCCUPIED) BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS: AS A POINT OF REFERENCE COMMENCE AT THE INTERSECTION OF THE NORTH LINE OF PALMAS GRANT, SECTION 38, TOWNSHIP 16 SOUTH, RANGE 33 EAST, WITH THE EASTERLY LINE OF U.S. HIGHWAY #1, (160 FOOT RIGHT OF WAY); THENCE SOUTH 01 DEGREES 05 MINUTES 04 SECONDS WEST ALONG THE EASTERLY LINE OF U.S. HIGHWAY #1 A DISTANCE OF 1583.55 FEET TO A POINT OF CURVATURE; THENCE ALONG A CURVE TO THE LEFT HAVING A RADIUS OF 3045.36 FEET AND THROUGH A CENTRAL ANGLE OF 01 DEGREES 30 MINUTES 18 SECONDS A DISTANCE OF 80.00 FEET TO THE POINT OF BEGINNING; THENCE CONTINUE ALONG SAID CURVE TO THE LEFT HAVING A RADIUS OF 3045.36 FEET AND THROUGH A CENTRAL ANGLE OF 07 DEGREES 25 MINUTES 10 SECONDS A DISTANCE OF 394.35 FEET TO A POINT; THENCE NORTH 82 DEGREES 09 MINUTES 39 SECONDS EAST A DISTANCE OF 20.00 FEET TO A POINT ON A CURVE; THENCE FROM A TANGENT BEARING OF SOUTH 07 DEGREES 49 MINUTES 42 SECONDS EAST ALONG A CURVE TO THE LEFT HAVING A RADIUS OF 3025.36 FEET AND THROUGH A CENTRAL ANGLE OF 06 DEGREES 47 MINUTES 36 SECONDS A DISTANCE OF 358.71 FEET TO A POINT ON THE MEAN HIGH WATERLINE OF ROSE BAY; THENCE IN A NORTHEASTERLY DIRECTION ALONG A MEAN HIGH WATER LINE A DISTANCE OF 745.00 FEET TO A POINT; THENCE NORTH 88 DEGREES 54 MINUTES 56 SECONDS WEST, A DISTANCE OF 285.00 FEET TO THE POINT OF BEGINNING.

LOTS 3 AND 4, BLOCK 12, LYING WEST OF THE RIGHT OF WAY OF THE FLORIDA EAST COAST RAILWAY, DOUGLAS MAP AND SUBDIVISION OF PALMAS GRANT, LOCATED IN SECTION 38, TOWNSHIP 16, SOUTH, RANGE 33 EAST, AS PER PLAT THEREOF RECORDED IN MAP BOOK 1, PAGE 23, PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA.



SPRUCE CREEK/VOLUSIA COUNTY
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This Instrument Prepared By and Please Return To:
 Krystal Whitlock
 American Home Title, Inc
 6703 North Himes Avenue
 Tampa, FL 33614
 AHT # 5223

WARRANTY DEED
(STATUTORY FORM - SECTION 689.02, F.S.)

THIS INDENTURE, made this 17th day of MAY, A.D. 2000,
 between 50,000, Inc., a Florida Corporation whose address is 720 Magnolia
 Street, New Smyrna Beach, FL 32168, grantor, and the BOARD OF
 TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF
 THE STATE OF FLORIDA, AND THE COUNTY OF VOLUSIA,
 FLORIDA, whose post office address is c/o Florida Department of
 Environmental Protection, Division of State Lands, 3900 Commonwealth
 Boulevard, Mail Station 115, Tallahassee, FL 32399-3000, grantees,

(Wherever used herein the terms "grantor" and "grantee" include all
 the parties to this instrument and their heirs, legal representatives, successors and assigns. "Grantor" and "grantee"
 are used for singular and plural, as the context requires and the use of any gender shall include all genders.)

WITNESSETH: That the said grantor, for and in consideration of the sum of Ten Dollars and other good and valuable
 considerations, to said grantor in hand paid by said grantee, the receipt whereof is hereby acknowledged, has granted, bargained
 and sold to the said grantee, and grantee's successors and assigns forever, the following described land situate, lying and being in
 Volusia County, Florida, to-wit:

See Exhibit "A" attached hereto and by reference made a part hereof.

Property Appraiser's Parcel Identification Number: 3687281.0000

This conveyance is subject to easements, restrictions, limitations and conditions of record if any now exist, but any such
 interests that may have been terminated are not hereby re-imposed.

AND the said grantor does hereby fully warrant the title to said land, and will defend the same against the lawful claims of all
 persons whomsoever.

IN WITNESS WHEREOF the grantor has hereunto set grantor's hand and seal, the day and year first above written.

Signed, sealed and delivered in the presence of:

Mary A. Cable
 (Signature of First Witness)

MARY A. CABLE
 (Printed name of First Witness)

Mary Ann Cotte
 (Signature of Second Witness)

MARY ANN COTTE
 (Printed Name of Second Witness)

50,000, Inc., a Florida Corporation

BY: David J. Wiley
 David J. Wiley, President

(Corporate Seal)

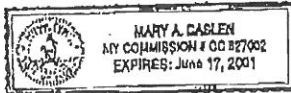
STATE OF FLORIDACOUNTY OF VOLUSIA

The foregoing instrument was acknowledged before me this 17th day of MAY, 2000, by David J. Wiley as President of \$0,000, Inc., a Florida Corporation, on behalf of the entity. Such person (notary Public must check applicable box):

- ☒ is personally known to me
() produced a current driver license
() produced _____ as identification

Mary A. Caslen
Notary Public

(NOTARY PUBLIC SEAL)



(Printed, Typed or Stamped Name of Notary Public)

Commission No.: _____

My Commission Expires: _____

Exhibit "A"

PARCEL "A": Beginning at the intersection of R.J. Christy's south line per Map Book 7, page 33 of the Public Records of Volusia County, Florida and the westerly right of way line of U.S. Highway #1, thence S63 degrees 41'40"W, 972.5 feet along said Christy's line to the East bank of Turnbull Creek; thence N00 degrees 30'30"E, 100 feet; thence N07 degrees 29'30"W, 216.92 feet; thence N41 degrees 48'10"W, 261.71 feet; thence N12 degrees 01'50"E, 138.17 feet; thence N24 degrees 13'40"E, 362.7 feet to a point on the curve of the westerly right of way line of U.S. Highway No. 1; thence southerly along the said curve of said right of way line 868.58 feet (arc distance) to said curve's PC; thence S68 degrees 49'30"E, 190.61 feet along said Highway right of way line to the Point of Beginning. All being in the Palmas Grant, Section 38, Township 16 South, Range 33 East, EXCEPTING THEREFROM THE FOLLOWING: Commence at the intersection of the westerly right of way line of U.S. Highway No. 1 and the southerly line of R.J. Christy's property as shown on map in Map Book 7, page 33, of the Public Records of Volusia County, Florida; thence northerly along the said right of way line 550.09 feet for the Point of Beginning; thence S05 degrees 01'40"W, 331.67 feet; thence N34 degrees 17'46"W, 300 feet; thence N03 degrees 01'40"E, 331.67 feet to the westerly right of way line of said U.S. Highway No. 1; thence southerly 300.25 feet along the said westerly right of way line to the Point of Beginning. All lying and being in the Palmas Grant, Section 38, Township 16 South, Range 33 East.

AND:

PARCEL "B": Commence at the intersection of R. J. Christy's south line per Map Book 7, page 33 of the Public Records of Volusia County, Florida and the westerly right of way line of U.S. Highway No. 1; thence S63 degrees 41'40"W, 972.5 feet along said Christy's line to the East bank of Turnbull Creek; thence N00 degrees 30'30"E, 100 feet for the Point of Beginning; thence N89 degrees 29'30"W, 355.74 feet; thence N39 degrees 29'30"W, 80.52 feet; thence N00 degrees 30'30"E, 84.48 feet; thence N45 degrees 30'30"E, 127.38 feet; thence S89 degrees 29'30"E, 305.21 feet; thence S07 degrees 29'30"E, 216.92 feet to the Point of Beginning. All being in the Palmas Grant, Section 38, Township 16 South, Range 33 East, EXCEPTING THEREFROM THE FOLLOWING: Lot 7, Divito's Unrecorded Subdivision, being a portion of the Palmas Grant, Section 38, Township 16 South, Range 33 East and being more particularly described as follows: Commence at the intersection of the R.J. Christy's south line per Map Book 7, page 33 of the Public Records of Volusia County, Florida and the westerly right of way line of U.S. Highway #1; thence S63 degrees 41'40"W, 972.50 feet along the said Christy's line to the east bank of Turnbull Creek; thence N00 degrees 30'30"E, 100.00 feet; thence N89 degrees 29'30"W, a distance of 231.37 feet for the POINT OF BEGINNING; thence continue N89 degrees 29'30"W, a distance of 124.38 feet; thence N59 degrees 29'30"W, a distance of 80.52 feet; thence N00 degrees 30'00"E, a distance of 84.48 feet; thence N45 degrees 30'30"E, a distance of 127.38 feet; thence S89 degrees 29'00"E, a distance of 104.04 feet; thence S09 degrees 30'30"W, a distance of 214.81 feet to the Point of Beginning.

AND:

PARCEL "C": Filled land being a portion of the Palmas Grant, Section 38, Township 16 South, Range 33 East and being described as follows: Commence at the intersection of R. J. Christy's south line per Map Book 7, page 33 of the Public Records of Volusia County, Florida and the westerly right of way line of U.S. Highway No. 1; thence S63 degrees 41'40"W, 972.5 feet along said Christy's line to the East bank of Turnbull Creek; thence N00 degrees 30'30"E, 100 feet; thence N07 degrees 29'30"W, a distance of 216.92 feet for the Point of Beginning; thence N89 degrees 29'30"W, a distance of 139.85 feet to the northerly edge of an existing bulkhead; thence northeasterly along said bulkhead N66 degrees 20'37"E, a distance of 55.70 feet; thence N30 degrees 03'28"E along said bulkhead, a distance of 53.12 feet; thence S41 degrees 48'10"E, a distance of 93.30 feet to the Point of Beginning.

Spruce Creek/50,000 Inc
Volusia County
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BEM APPROVED
By: SK Date 7-21-99

ATL1

114.3 Acres

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT
TRUST FUND OF THE STATE OF FLORIDA

AMENDMENT NUMBER ONE TO LEASE NUMBER 4195

THIS LEASE AMENDMENT is entered into this 19th day of
February, 2001, by and between the BOARD OF TRUSTEES OF
THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA,
hereinafter referred to as "LESSOR" and VOLUSIA COUNTY, FLORIDA,
hereinafter referred to as "LESSEE";

W I T N E S S E T H

WHEREAS, LESSOR, by virtue of Section 253.03, Florida
Statutes, holds title to certain lands and property for the use
and benefit of the State of Florida; and

WHEREAS, on January 12, 2001, LESSOR and LESSEE entered into
Lease Number 4195; and

WHEREAS, LESSOR and LESSEE desire to amend the lease to add
land to the leased property.

NOW THEREFORE, in consideration of the mutual covenants and
agreements contained herein, the parties hereto agree as follows:

1. The legal description of the leased premises set forth in
Exhibit "A" of Lease Number 4195 is hereby amended to include the
real property described in Exhibit "A," attached hereto, and by
reference made a part hereof.
2. It is understood and agreed by LESSOR and LESSEE that in
each and every respect the terms of the Lease Number 4195 except
as amended shall remain unchanged and in full force and effect
and the same are hereby ratified, approved and confirmed by
LESSOR and LESSEE.

IN WITNESS WHEREOF, the parties have caused this Lease
Amendment to be executed on the day and year first above written.

BOARD OF TRUSTEES OF THE INTERNAL
IMPROVEMENT TRUST FUND OF THE
STATE OF FLORIDA

Judy Woodard
Witness
Judy Woodard
Print/Type Witness Name

Alfreda Mathis
Witness
Alfreda Mathis
Print/Type Witness Name

By: Gloria C. Nelson (SEAL)
GLORIA C. NELSON, OPERATIONS
AND MANAGEMENT CONSULTANT
MANAGER, BUREAU OF PUBLIC LAND
ADMINISTRATION, DIVISION OF
STATE LANDS, DEPARTMENT OF
ENVIRONMENTAL PROTECTION

"LESSOR"

STATE OF FLORIDA
COUNTY OF LEON

The foregoing instrument was acknowledged before me this
19th day of February, 2000, by Gloria C. Nelson,
Operations and Management Consultant Manager, Bureau of Public
Land Administration, Division of State Lands, Florida Department
of Environmental Protection, as agent for and on behalf of the
Board of Trustees of the Internal Improvement Trust Fund of the
State of Florida. She is personally known to me.

Sylvia S. Roberts
Notary Public, State of Florida

Print/Type Notary Name

Commission Number:

Commission Expires:



Sylvia S. Roberts
MY COMMISSION # CC654057 EXPIRES
July 25, 2001
BONDED THRU TROY FAIR INSURANCE, INC.

Approved as to Form and Legality

By: Sam H. Hain
DEF Attorney

Constance Gimba
Witness

VOLUSIA COUNTY, FLORIDA
BY ITS COUNTY COUNCIL

By: Dwight D. Lewis (SEAL)

Constance Gimba
Print/Type Witness Name

Dwight D. Lewis
Print/Type Name

Carol S. Dill
Witness

Title: Chairman

Carol S. Dill
Print/Type Witness Name

ATTEST: [Signature]
County Manager/Clerk
County Council of Volusia of
County

"LESSEE"

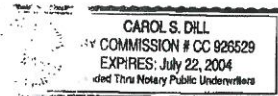
STATE OF FLORIDA
COUNTY OF VOLUSIA

The foregoing instrument was acknowledged before me this
12th day of February, 2001, by Dwight D. Lewis and
Ray W. Pennebaker as Chairman and
Chief Operating Officer, respectively, on behalf of the
County Council of Volusia County. They are personally known to
me.

Carol S. Dill
Notary Public, State of Florida
Carol S. Dill
Print/Type Notary Name

Commission Number:

Commission Expires:



APPROVED BY: [Signature]
FRANK B. GUMMEY, III
Assistant County Attorney
County of Volusia

Please Return To:

Wendi McAleese
American Home Title Insurance, Inc.
2901 W. Busch Blvd., Ste. 910
Tampa, FL 33618

EXHIBIT "A"
LEGAL DESCRIPTION

(Transfer Amt \$1390000)
Instrument # 2000-115072
Book: 4566
Page: 2964

SPECIAL WARRANTY DEED

THIS INDENTURE, made this 28th day of June, A.D. 2000, between the ATLANTIC CENTER FOR THE ARTS, INC., a Florida non-profit corporation, whose post office address is 1414 Art Center Blvd. New Smyrna Beach, FL 32169, Grantor, and the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA, whose post office address is c/o Florida Department of Environmental Protection, Division of State Lands, 3900 Commonwealth Boulevard, Mail Station 115, Tallahassee, FL 32399-3000, grantee,

(Wherever used herein the terms "grantor" and "grantee" include all the parties to this instrument and their legal representatives, successors and assigns. "Grantor" and "grantee" are used for singular and plural, as the context requires and the use of any gender shall include all genders.)

WITNESSETH: That the said grantor, for and in consideration of the sum of \$10.00 and other good and valuable considerations to said grantor in hand paid by said grantee, the receipt whereof is hereby acknowledged, has granted, bargained and sold to the said grantee, and grantee's successors and assigns forever, the following described land situate, lying and being in Volusia County, Florida, to-wit:

See Exhibit "A" attached hereto and by reference made a part hereof.

Property Appraiser's Parcel ID Number: SEE EXHIBIT "B" ATTACHED HERETO

Grantor herein further releases any and all right, title or interest it may have in that certain easement set forth in the Warranty Deed recorded January 16, 1986 in Official Records Book 2774, Page 1561 of the Public Records of Volusia County, Florida. Reserving, however, to the Grantor, a perpetual, non-exclusive easement for ingress and egress purposes over, across and through Parcel "9" described in Exhibit "A" attached hereto. Said easement is appurtenant to Grantor's lands located to the west of the lands conveyed in this deed.

This conveyance is subject to easements, restrictions, limitations and conditions of record if any now exist, but any such interests that may have been terminated are not hereby re-imposed.

TO HAVE AND TO HOLD the same unto the said grantee in fee simple forever.

AND the said grantor does hereby fully warrant the title to said land, and will defend the same against the lawful claims of all persons claiming by, through or under the said grantor, but against none other.

IN WITNESS WHEREOF the grantor has executed these presents, the day and year first written.

Signed, sealed and delivered in the presence of:

ATLANTIC CENTER FOR THE ARTS, INC., a Florida non-profit corporation

Kathryn Williams
(Signature of First Witness)
Kathryn B. Williams
Printed name of First Witness

BY:

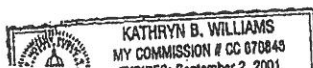
Paul Markunas
PAUL MARKUNAS, Chief Executive Officer.

Terry L. McMillian
(Signature of Second Witness)
Terry L. McMillian
Printed name of Second Witness

(CORPORATE SEAL)

STATE OF FLORIDA
COUNTY OF Orange

The foregoing instrument was acknowledged before me this 28th day of June, 2000, by PAUL MARKUNAS as Chief Executive Officer of ATLANTIC CENTER FOR THE ARTS, INC., a Florida non-profit corporation, on behalf of said corporation. Such person is personally known to me or produced _____ as identification.



Kathryn Williams
Notary Public,
(NOTARY PUBLIC SEAL)

EXHIBIT "A"

PARCEL 1

U.S. LOT 1 AND THE NORTH 354 FEET OF U.S. LOT 2, ALL LYING WEST OF A MID-LINE OF THE MAIN STREAM OF MURRAY CREEK, ALL IN SECTION 36, TOWNSHIP 16 SOUTH, RANGE 33 EAST, VOLUSIA COUNTY, FLORIDA.

PARCEL 2

THE SOUTH 326 FEET OF THE NORTH 680 FEET OF THAT PART OF U.S. LOT 2, SECTION 36, TOWNSHIP 16 SOUTH, RANGE 33 EAST, LYING WEST OF THE EAST BANK OF MURRAY CREEK, VOLUSIA COUNTY, FLORIDA.

PARCEL 3

THE NORTH 1679 FEET OF THE EAST 300 FEET OF U.S. LOT 1, SECTION 35, TOWNSHIP 16 SOUTH, RANGE 33 EAST, VOLUSIA COUNTY, FLORIDA.

TOGETHER WITH A 20 FOOT EASEMENT DESCRIBED IN OFFICIAL RECORD BOOK 2054, PAGE 0917, PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA.

PARCEL 4

THE EAST 50 FEET OF THE SOUTH 968.30 FEET OF THE NORTH 2644.60 FEET OF SECTION 35, TOWNSHIP 16 SOUTH, RANGE 33 EAST, VOLUSIA COUNTY, FLORIDA, LESS AND EXCEPT ANY PORTION THEREOF LYING WITHIN THE LIMITS OF THE COUNTY MAINTENANCE OF ARTS CENTER ROAD.

PARCEL 5

THE EAST 300 FEET OF SECTION 26, TOWNSHIP 16 SOUTH, RANGE 33 EAST, EXCEPT THE NORTHERLY 100 FEET, AS MEASURED AT RIGHT ANGLES TO THE SOUTH LINE OF THE PALMAS GRANT, SECTION 38, TOWNSHIP 16 SOUTH, RANGE 33 EAST, VOLUSIA COUNTY, FLORIDA.

PARCEL 6

THAT PART OF U.S. LOT 2, SECTION 25, TOWNSHIP 16 SOUTH, RANGE 33 EAST, LYING SOUTHWESTERLY OF U.S. HIGHWAY NO. 1, AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCE AT THE INTERSECTION OF THE SOUTH LINE OF THE PALMAS GRANT, SECTION 38, TOWNSHIP 16 SOUTH, RANGE 33 EAST AND THE SOUTH RIGHT-OF-WAY OF U.S. HIGHWAY NO. 1 (STATE ROAD 5) AS SHOWN ON D.O.T. RIGHT-OF-WAY PLAT NO. 7901 (279) 175, A 180 FOOT RIGHT-OF-WAY AS NOW LAID OUT; THENCE ALONG SAID SOUTH RIGHT-OF-WAY OF U.S. HIGHWAY NO. 1 SOUTH 68 DEGREES, 49 MINUTES, 26 SECONDS EAST FOR A DISTANCE OF 128.16 FEET TO A POINT SAID POINT BEING AT THE INTERSECTION OF A LINE 100 FEET SOUTHERLY AND PARALLEL TO THE SOUTH LINE OF THE PALMAS GRANT; THENCE ALONG SAID LINE SOUTH 59 DEGREES, 53 MINUTES, 25 SECONDS WEST FOR A DISTANCE OF 407.76 FEET FOR THE POINT OF BEGINNING; THENCE SOUTH 30 DEGREES, 06 MINUTES, 35 SECONDS EAST ALONG THE WEST SIDE OF A 50 FOOT ROAD FOR A

Spruce Creek/Bolt
Volusia County
1 of 3

DSM APPROVED
By SK Date 6-21-00

DISTANCE OF 350 FEET; THENCE PARALLEL TO THE SOUTH LINE OF PALMAS GRANT SOUTH 59 DEGREES, 53 MINUTES, 25 SECONDS WEST FOR A DISTANCE OF 350 FEET; THENCE NORTH 30 DEGREES, 06 MINUTES, 35 SECONDS WEST PARALLEL TO SAID 50 FOOT RIGHT-OF-WAY 350 FEET TO A POINT IN THE SOUTH LINE OF 100 FOOT RIGHT-OF-WAY AFOREMENTIONED; THENCE NORTH 59 DEGREES, 53 MINUTES, 25 SECONDS EAST ALONG SAID SOUTH LINE FOR A DISTANCE OF 350 FEET TO THE POINT OF BEGINNING.

TOGETHER WITH THE EASEMENT, RIGHTS AND PRIVILEGES UNDER THE EASEMENT RECORDED IN OFFICIAL RECORDS BOOK 1705, PAGE 1739, PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA.

• PARCEL 7 & 8 COMBINED

A PART OF U.S. LOT 2, SECTION 25, TOWNSHIP 16 SOUTH, RANGE 33 EAST, BEING DESCRIBED AS FOLLOWS: COMMENCE AT THE SOUTHWEST CORNER OF SECTION 25, TOWNSHIP 16 SOUTH, RANGE 33 EAST; THENCE ALONG THE SOUTH LINE SAID SECTION 25, SOUTH 89 DEGREES, 15 MINUTES, 55 SECONDS EAST, 400.79 FEET FOR THE POINT OF BEGINNING; THENCE CONTINUING ON SAID SOUTH LINE SECTION 25, SOUTH 89 DEGREES, 15 MINUTES, 55 SECONDS EAST, 812.66 FEET; THENCE CONTINUE ALONG SAID SOUTH LINE OF SECTION 25, SOUTH 89 DEGREES, 08 MINUTES, 06 SECONDS EAST, 320.60 FEET MORE OR LESS TO THE CENTERLINE OF MURRAY CREEK; THENCE ALONG THE CENTERLINE OF MURRAY CREEK IN A NORTHWESTERLY DIRECTION FOR A DISTANCE OF 580 FEET MORE OR LESS TO A POINT INTERSECTING WITH THE SOUTHERLY RIGHT-OF-WAY LINE OF U.S. HIGHWAY No. 1 (A 180 FOOT RIGHT-OF-WAY) WITH A BEARING OF SOUTH 68 DEGREES 50 MINUTES, 46 SECONDS EAST; THENCE NORTH 68 DEGREES 50 MINUTES 46 SECONDS WEST, ALONG SAID SOUTHERLY RIGHT-OF-WAY LINE OF U.S. HIGHWAY No. 1, 498.45 FEET, MORE OR LESS TO A POINT SITUATE ON SAID SOUTHERLY RIGHT-OF-WAY LINE OF U.S. HIGHWAY No. 1; THENCE SOUTH 59 DEGREES 55 MINUTES 54 SECONDS WEST, DEPARTING FROM SAID SOUTHERLY RIGHT-OF-WAY LINE OF SAID U.S. HIGHWAY No. 1, PARALLEL TO AND 100 FEET SOUTH OF THE PALMAS GRANT, SECTION 38, TOWNSHIP 16 SOUTH, RANGE 33 EAST, 407.76 FEET TO THE WESTERLY LINE OF A 50 FOOT ROAD EASEMENT; THENCE SOUTH 30 DEGREES, 04 MINUTES, 06 SECONDS EAST, ALONG SAID WESTERLY LINE OF SAID 50 FOOT ROAD EASEMENT, 350.00 FEET; THENCE SOUTH 59 DEGREES, 55 MINUTES, 54 SECONDS WEST PARALLEL TO SAID PALMAS GRANT FOR A DISTANCE OF 350.00 FEET; THENCE SOUTH 30 DEGREES, 04 MINUTES, 06 SECONDS EAST A DISTANCE OF 31.43 FEET TO THE POINT OF BEGINNING.

Spruce Creek/Bolt
Volusia County
2 of 3

BSM APPROVED
By SK Date 6-21-00

PARCEL 9

THE NORTHERLY 100 FEET AS MEASURED AT RIGHT ANGLES TO THE SOUTH LINE OF THE PALMAS GRANT, SECTION 38, TOWNSHIP 16 SOUTH, RANGE 33 EAST, OF THE EASTERLY 300 FEET OF SECTION 26, TOWNSHIP 16 SOUTH, RANGE 33 EAST, AND OF THAT PART OF SECTION 25, TOWNSHIP 16 SOUTH, RANGE 33 EAST, LYING WESTERLY OF U.S. HIGHWAY NO. 1, VOLUSIA COUNTY, FLORIDA.

EXHIBIT "B"

6336-00-00-0015

6336-00-00-0032

6335-00-00-0070

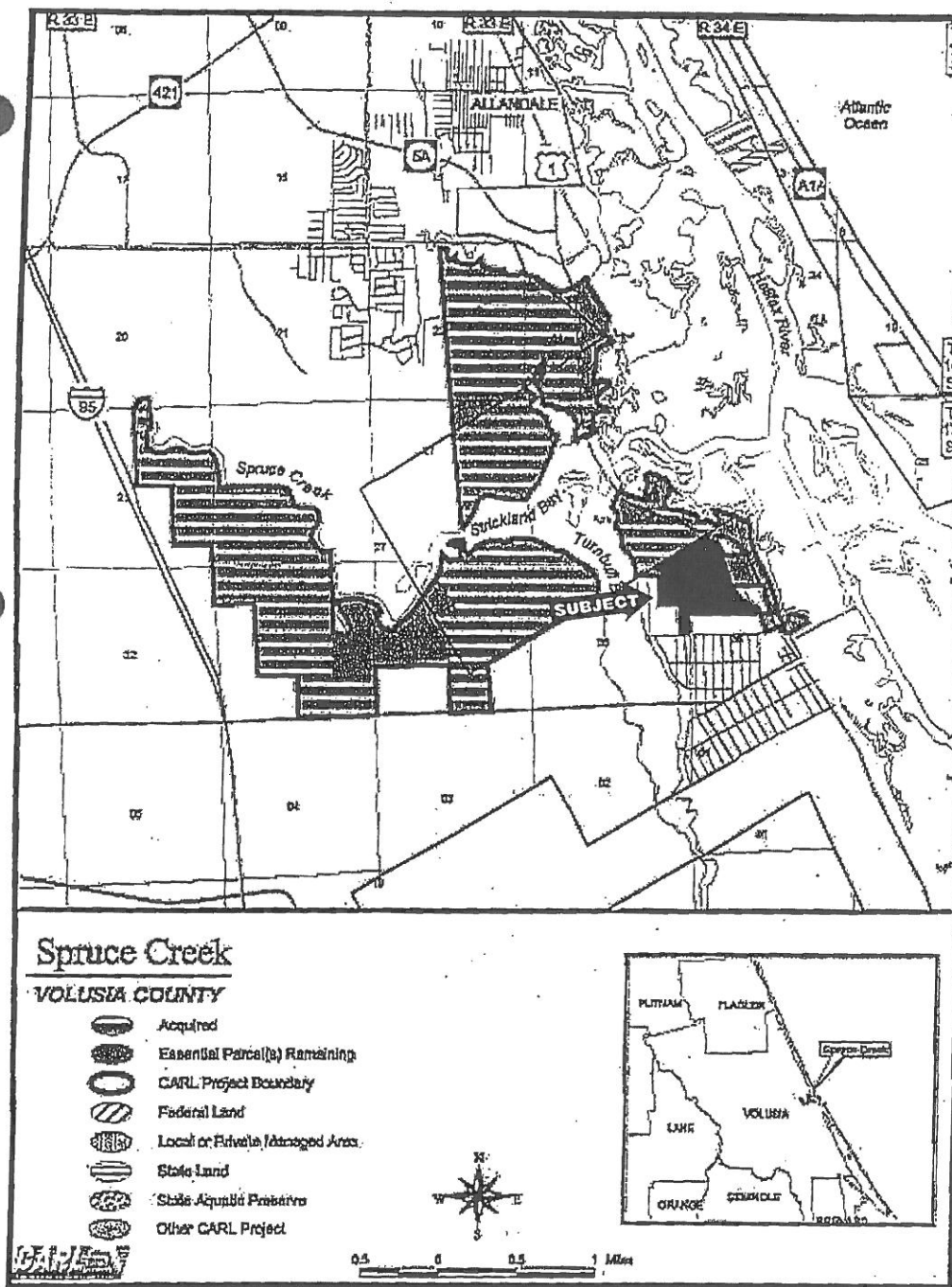
6325-00-00-0011

6325-00-00-0023

6325-00-00-0020

6325-00-00-0010

6326-00-00-0010



SPRUCE CREEK
ATLANTIC CENTER FOR THE ARTS
SECTIONS 25,26,35 + 36 - TOWNSHIP 16 SOUTH - RANGE 33 EAST
VOLUSIA COUNTY, FLORIDA

ATL1

114.3 Acres

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT
TRUST FUND OF THE STATE OF FLORIDA

AMENDMENT NUMBER ONE TO LEASE NUMBER 4195

THIS LEASE AMENDMENT is entered into this ____ day of _____, 20__, by and between the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA, hereinafter referred to as "LESSOR" and VOLUSIA COUNTY, FLORIDA, hereinafter referred to as "LESSEE";

W I T N E S S E T H

WHEREAS, LESSOR, by virtue of Section 253.03, Florida Statutes, holds title to certain lands and property for the use and benefit of the State of Florida; and

WHEREAS, on January 12, 2001, LESSOR and LESSEE entered into Lease Number 4195; and

WHEREAS, LESSOR and LESSEE desire to amend the lease to add land to the leased property.

NOW THEREFORE, in consideration of the mutual covenants and agreements contained herein, the parties hereto agree as follows:

1. The legal description of the leased premises set forth in Exhibit "A" of Lease Number 4195 is hereby amended to include the real property described in Exhibit "A," attached hereto, and by reference made a part hereof.
2. It is understood and agreed by LESSOR and LESSEE that in each and every respect the terms of the Lease Number 4195 except as amended shall remain unchanged and in full force and effect and the same are hereby ratified, approved and confirmed by LESSOR and LESSEE.

ATL1

(15.47 acres)

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT
TRUST FUND OF THE STATE OF FLORIDA

AMENDMENT NUMBER 2 TO LEASE NUMBER 4195
SPRUCE CREEK

THIS LEASE AMENDMENT is entered into this 23rd day of July,
2002, by and between the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST
FUND OF THE STATE OF FLORIDA, hereinafter referred to as "LESSOR" and VOLUSIA
COUNTY, FLORIDA, hereinafter referred to as "LESSEE";

W I T N E S S E T H

WHEREAS, LESSOR, by virtue of Section 253.03, Florida Statutes, holds
title to certain lands and property for the use and benefit of the State of
Florida; and

WHEREAS, on January 12, 2001, LESSOR and LESSEE entered into Lease
Number 4195; and

WHEREAS, LESSOR and LESSEE desire to amend the lease to add land to the
leased property.

NOW THEREFORE, in consideration of the mutual covenants and agreements
contained herein, the parties hereto agree as follows:

1. The legal description of the leased premises set forth in Exhibit "A" of
Lease Number 4195 is hereby amended to include the real property described in
Exhibit "A," attached hereto, and by reference made a part hereof.
2. It is understood and agreed by LESSOR and LESSEE that in each and every
respect the terms of the Lease Number 4195, except as amended, shall remain
unchanged and in full force and effect and the same are hereby ratified,
approved and confirmed by LESSOR and LESSEE.

IN WITNESS WHEREOF, the parties have caused this Lease
Amendment to be executed on the day and year first above written.

BOARD OF TRUSTEES OF THE INTERNAL
IMPROVEMENT TRUST FUND OF THE
STATE OF FLORIDA

Judy Woodward
Witness
Judy Woodward
Print/Type Witness Name

Holence Davis
Witness
Holence Davis
Print/Type Witness Name

By: Gloria C. Nelson (SEAL)
GLORIA C. NELSON, OPERATIONS
AND MANAGEMENT CONSULTANT
MANAGER, BUREAU OF PUBLIC LAND
ADMINISTRATION, DIVISION OF
STATE LANDS, DEPARTMENT OF
ENVIRONMENTAL PROTECTION

"LESSOR"

STATE OF FLORIDA
COUNTY OF LEON

The foregoing instrument was acknowledged before me this 23rd day of July, 2002, by Gloria C. Nelson, Operations and Management Consultant Manager, Bureau of Public Land Administration, Division of State Lands, Florida Department of Environmental Protection, as agent for and on behalf of the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida. She is personally known to me.

Cheryl J. King
Notary Public, State of Florida
Print/Type Notary Name

Commission Number:

Commission Expires:



Approved As to Form and Legality

By: [Signature]
DEP Attorney

VOLUSIA COUNTY, FLORIDA,
BY ITS COUNTY COUNCIL

Constance Gindra
Witness

CONSTANCE GINRA
Print/Type Witness Name

Diane Tyler
Witness

Diane Tyler
Print/Type Witness Name

By: [Signature] (SEAL)

Anna McFall
Print/Type Name


Title: [Signature]

ATTEST: [Signature]
County Manager/Clerk
County Council of Volusia County

"LESSEE"

STATE OF FLORIDA
COUNTY OF VOLUSIA

The foregoing instrument was acknowledged before me this 17th day of July, 2002, by Anna McFall and Ron W. Brantchaker, as Clerk and Volusia County Manager, respectively, on behalf of the County Council of Volusia County. They are personally known to me.

 Susan M Whittaker
My Commission CC754321
Expires August 8, 2002

[Signature]
Notary Public, State of Florida

SUSAN M. WHITTAKER

Print/Type Notary Name

Commission Number: CC754321

Commission Expires: 8/8/02

Please Return To:
Daniel E. Manausa, Esquire
Smith, Thompson, Shaw, & Manausa, P. A.
3520 Thomasville Road, 4th Floor
Tallahassee, FL 32308-3469

WARRANTY DEED
(STATUTORY FORM - SECTION 689.02, F.S.)

THIS INDENTURE, made this 23 day of February, A.D. 2002, between ROBERT A. KAYAT AND ERNESTINA D. KAYAT, whose collective post office address is 4100 U. S. Highway 1 South, Edgewater, Florida 32141, grantors, and the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA, whose post office address is c/o Florida Department of Environmental Protection, Division of State Lands, 3900 Commonwealth Boulevard, Mail Station 115, Tallahassee, FL 32399-3000, grantee,

(Wherever used herein the terms "grantor" and "grantee" include all the parties to this instrument and their heirs, legal representatives, successors and assigns. "Grantor" and "grantee" are used for singular and plural, as the context requires and the use of any gender shall include all genders.)

WITNESSETH: That the said grantors, for and in consideration of the sum of Ten Dollars and other good and valuable considerations, to said grantors in hand paid by said grantee, the receipt whereof is hereby acknowledged, have granted, bargained and sold to the said grantee, and grantee's successors and assigns forever, the following described land situate, lying and being in Volusia County, Florida, to-wit:

See Exhibit "A" attached hereto and by reference made a part hereof.

Property Appraiser's Parcel Identification Number: 632500000030 & 633801260010

This conveyance is subject to easements, restrictions, limitations, and conditions of record if any now exist, but any such interests that may have been terminated are not hereby re-imposed.

This property is not the homestead property of the grantors, nor contiguous to homestead property, as such homestead is defined under Florida law.

AND the said grantors do hereby fully warrant the title to said land, and will defend the same against the lawful claims of all persons whomsoever.

IN WITNESS WHEREOF the grantors have hereunto set grantors' hands and seals, the day and year first above written.

Signed, sealed and delivered in
the presence of:

Kim Caron
(Signature of First Witness)

KIM CARON
(Printed, Typed or Stamped Name
of First Witness)

Donna J. Austin
(Signature of Second Witness)

DONNA J. AUSTIN
(Printed, Typed or Stamped Name
of Second Witness)

Robert A. Kayat
Robert A. Kayat

Exhibit A
Page 4 of 7 Pages
Att. 2 to Lease 4195

Approved for Closing
By: [Signature]
DEP Attorney
Date: 2-15-02

Kim Caron
(Signature of First Witness)

KIM CARON
(Printed, Typed or Stamped Name
of First Witness)

Donna J. Austin
(Signature of Second Witness)

DONNA J. AUSTIN
(Printed, Typed or Stamped Name
of Second Witness)

Ernestina D. Kayat
Ernestina D. Kayat

STATE OF FLORIDA
COUNTY OF VOLUSIA

The foregoing instrument was acknowledged before me this 13 day of February 2002, by Robert A. Kayat. Such person (Notary Public must check applicable box):

☒ is personally known to me.
() produced a driver license.
() produced _____ as identification.

(NOTARY PUBLIC SEAL)



Donna J. Austin
Notary Public

DONNA J. AUSTIN
(Printed, Typed or Stamped Name of Notary Public)

Commission No.: CC776068

My Commission Expires: 10-20-02

STATE OF FLORIDA
COUNTY OF VOLUSIA

The foregoing instrument was acknowledged before me this 12 day of February 2002, by Ernestina D. Kayat. Such person (Notary Public must check applicable box):

☒ is personally known to me.
() produced a driver license.
() produced _____ as identification.

(NOTARY PUBLIC SEAL)



Donna J. Austin
Notary Public

DONNA J. AUSTIN

(Printed, Typed or Stamped Name of Notary Public)

Commission No.: CC776068

My Commission Expires: 10-20-02

WDP144a.0101

Exhibit A
Page 5 of 7 Pages
Atty. 2 to Lease 4195

Exhibit "A"

That portion of Government Lot 2, Section 25, Township 16 South, Range 33 East, Volusia County, Florida lying North and East of U.S. Highway #1 (also known as State Road No. 5) a 160 foot and 180 foot R/W as now laid out and shown on State Road R/W maps, including old U.S. Highway No. 1 (S.R. #4).

AND

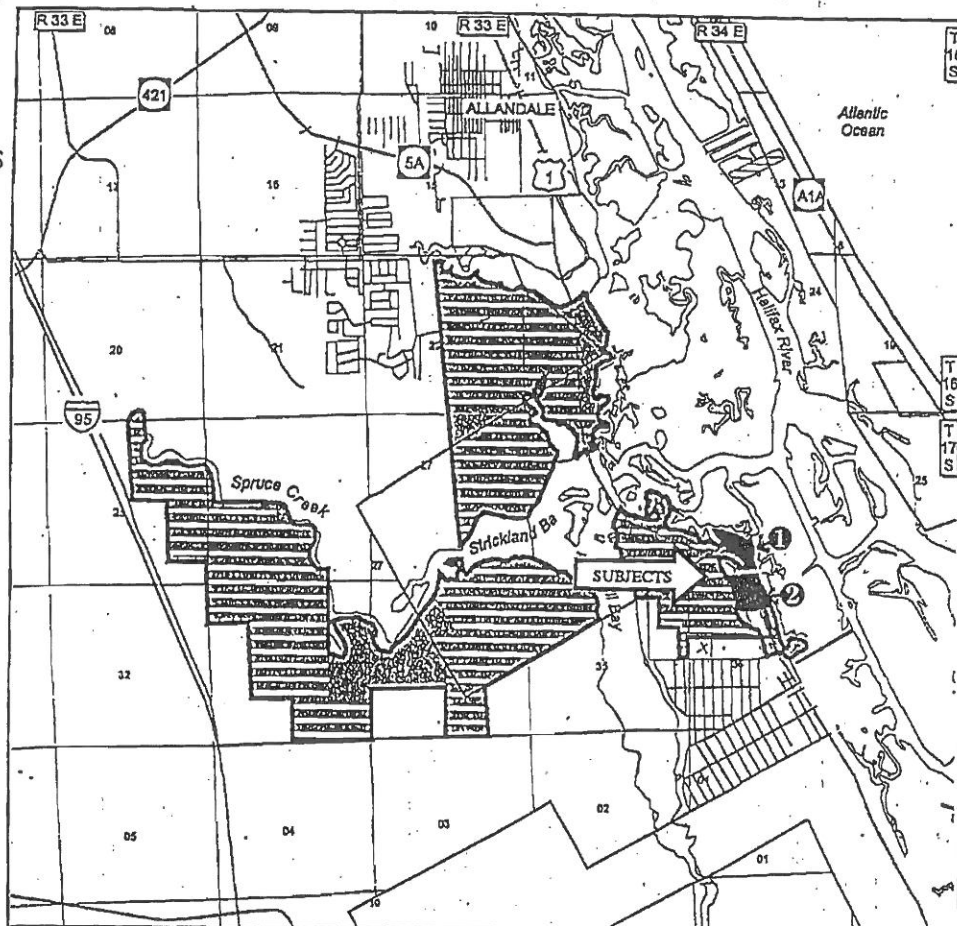
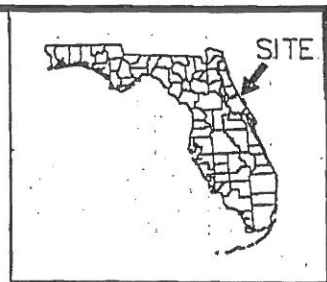
Block A, Palmas Grant, Section 38, Township 16 South, Range 33 East, as shown on map in Map Book 1, Page 23 of the Public Records of Volusia County, Florida.

Exhibit A
Page 6 of 7 Pages
Am. 2 to Lease 4195

Spruce Creek/KMB Development Corp.
Volusia County






Page 11

✓ BSM APPROVED
By SK Date 3-28-01



Spruce Creek

VOLUSIA COUNTY

-  Acquired
-  Essential Parcel(s) Remaining
-  CARL Project Boundary
-  KMB PROPERTY
-  BOLT PROPERTY



0.5 0 0.5 1 Miles

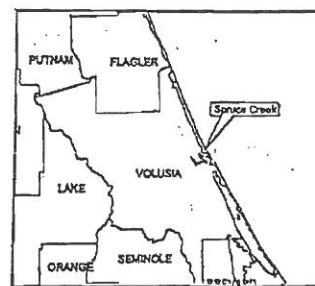


Exhibit A

Page 7 of 7 Pages

Am. 2 to Lease 4195

SPRUCE CREEK
BOLT & KMB DEVELOPMENT CORP.
SECTIONS 25, 36, 38 - TOWNSHIP 16 SOUTH - RANGE 33 EAST
VOLUSIA COUNTY, FLORIDA

ATTACHMENT 2
PAGE 1

ATL1

126.65 Acres

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT

TRUST FUND OF THE STATE OF FLORIDA

AMENDMENT NUMBER 3 TO LEASE NUMBER 4195

SPRUCE CREEK

THIS LEASE AMENDMENT is entered into this 11th day of April, 2003, by and between the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA, hereinafter referred to as "LESSOR" and VOLUSIA COUNTY, FLORIDA, hereinafter referred to as "LESSEE;

W I T N E S S E T H

WHEREAS, LESSOR, by virtue of Section 253.03, Florida Statutes, holds title to certain lands and property for the use and benefit of the State of Florida; and

WHEREAS, on January 12, 2001, LESSOR and LESSEE entered into Lease Number 4195; and

WHEREAS, LESSOR and LESSEE desire to amend the lease to add land to the leased property.

NOW THEREFORE, in consideration of the mutual covenants and agreements contained herein, the parties hereto agree as follows:

1. The legal description of the leased premises set forth in Exhibit "A" of Lease Number 4195 is hereby amended to include the real property described in Exhibit "A," attached hereto, and by reference made a part hereof.

2. It is understood and agreed by LESSOR AND LESSEE that in each and every respect the terms of the Lease Number 4195 except as amended shall remain unchanged and in full force and effect and the same are hereby ratified, approved and confirmed by LESSOR AND LESSEE.

IN WITNESS WHEREOF, the parties have caused this Lease
Amendment to be executed on the day and year first above written.

BOARD OF TRUSTEES OF THE INTERNAL
IMPROVEMENT TRUST FUND OF THE
STATE OF FLORIDA

Judy Woodard
Witness

Judy Woodard
Print/Type Witness Name

Fredrica W. Jones
Witness

Fredrica W. Jones
Print/Type Witness Name

By: Gloria C. Nelson (SEAL)
GLORIA C. NELSON, OPERATIONS
AND MANAGEMENT CONSULTANT
MANAGER, BUREAU OF PUBLIC
LAND ADMINISTRATION, DIVISION
OF STATE LANDS, DEPARTMENT OF
ENVIRONMENTAL PROTECTION

"LESSOR"

STATE OF FLORIDA
COUNTY OF LEON

11th The foregoing instrument was acknowledged before me this
day of April, 2003, by Gloria C. Nelson,
Operations and Management Consultant Manager, Bureau of Public
Land Administration, Division of State Lands, Florida Department
of Environmental Protection, as agent for and on behalf of the
Board of Trustees of the Internal Improvement Trust Fund of the
State of Florida.

Diane C. Rogowski
Notary Public, State of Florida

Print/Type Notary Name Diane C. Rogowski

Commission Number:  MY COMMISSION # DD113323 EXPIRES
May 24, 2006
BONDED THRU TROY FARM INSURANCE, INC.

Commission Expires:

Approved as to Form and Legality

By: Sam L. Hester
DEP Attorney

VOLUSIA COUNTY, FLORIDA
by its County Council

Constance Gimba
Witness

By: Frank T. Bruno, Jr. (SEAL)

Constance Gimba
Print/Type Witness Name

Frank Bruno
Print/Type Name

Diane Tyler
Witness

Title: Chair, County Council

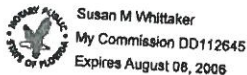
Diane Tyler
Print/Type Witness Name

ATTEST: Ray W. Pennabaker
County Manager/Clerk
County Council of Volusia
County

"LESSEE"

STATE OF FLORIDA
COUNTY OF VOLUSIA

The foregoing instrument was acknowledged before me this
17th day of March, 2003, by Frank T. Bruno, Jr.
and Ray W. Pennabaker, as Council Chair
and Deputy County Manager, respectively, on behalf of
the County Council of Volusia County. They are personally known
to me.



Susan M. Whittaker
Notary Public, State of Florida
Susan M. Whittaker
Print/Type Notary Name

Commission Number: **DD112645**

Commission Expires: **8/8/06**

This Instrument Prepared By and

Please Return To: Elaine Vergara
American Government Services Corp
2901 West Bush Blvd Suite 910
Tampa, Florida 33618

05/16/2002 12:18
Doc stamps 0.70
(Transfer Amt \$ 10)
Instrument # 2002-107434
Book: 4864
Page: 4667

COUNTY DEED

(STATUTORY FORM - SECTION 125.411, F.S.)

THIS INDENTURE, made this 12th day

of April, A.D. 2002, between County of Volusia, a political subdivision of the State of Florida, whose address is 123 W. Indiana Avenue, Deland, 32720, of the County of Volusia, in the State of Florida, party of the first part, and the BOARD OF TRUSTEES OF THE INTERNAL

IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA, whose post office address is c/o Florida Department of Environmental Protection, Division of State Lands, 3900 Commonwealth Boulevard, Mail Station 115, Tallahassee, FL 32399-3000, party of the second part,

(Wherever used herein the terms "party of the first part" and "party of the second part" include all the parties to this instrument and their heirs, legal representatives, successors and assigns. "Party of the first part" and "party of the second part" are used for singular and plural, as the context requires and the use of any gender shall include all genders.)

WITNESSETH: That the said party of the first part, for and in consideration of the sum of Ten Dollars, to it in hand paid by the party of the second part, receipt whereof is hereby acknowledged, has granted, bargained and sold to the said party of the second part, its successors and assigns forever, the following described land situate, lying and being in Volusia County, Florida, to-wit:

See Exhibit "A" attached hereto and by reference made a part hereof.

Acceptance of Transfer of Title to Donated Lands attached hereto as Exhibit "B" and by reference made a part hereof.

Property Appraiser's Parcel Identification Number: 6333-00-00-0080; 6333-00-00-0050; 6333-00-00-0040; 6329-00-00-0041; 6328-00-00-0140; 6328-00-00-0130; 6328-00-00-0120; 6328-00-00-0110, 6328-00-00-0112.

IN WITNESS WHEREOF the said party of the first part has caused these presents to be executed in its name by its County Council acting by the Chair or Vice Chair of said council, the day and year aforesaid.

COUNTY OF VOLUSIA
a political subdivision of the State of Florida

BY: Ann McFall

Ann McFall, Chair
County of Volusia Council

Attest: Cynthia A. Coto

Cynthia A. Coto, County Manager

(Official Seal)

EXHIBIT "A"

The Northwest $\frac{1}{4}$ of the Southwest $\frac{1}{4}$ and the West 430 feet of the Southwest $\frac{1}{4}$ of the Southwest $\frac{1}{4}$ and the East 890 feet of the Southwest $\frac{1}{4}$ of the Southwest $\frac{1}{4}$ and the East $\frac{1}{2}$ of the Southwest $\frac{1}{4}$, except the East 668.9 feet of the East $\frac{1}{2}$ of the Northeast $\frac{1}{4}$ of the Southwest $\frac{1}{4}$ lying North of Spruce Creek and West $\frac{1}{2}$ of the Southeast $\frac{1}{4}$ lying Southwest of the main run of Spruce Creek, all in Section 28, Township 16 South, Range 33 East, Volusia County, Florida.

TOGETHER WITH

The Northwest $\frac{1}{4}$ of the Northwest $\frac{1}{4}$ and the East $\frac{1}{2}$ of the Northwest $\frac{1}{4}$ and the Northwest $\frac{1}{4}$ of the Northeast $\frac{1}{4}$ and the Southwest $\frac{1}{4}$ of the Northeast $\frac{1}{4}$, and the Northeast $\frac{1}{4}$ of the Southwest $\frac{1}{4}$ and the Northwest $\frac{1}{4}$ of the Southeast $\frac{1}{4}$ and South $\frac{1}{2}$ of the Southeast $\frac{1}{4}$, all in Section 33, Township 16 South, Range 33 East, Volusia County, Florida.

TOGETHER WITH

All of the Northeast $\frac{1}{4}$ of the Southeast $\frac{1}{4}$, also the North 511 feet of the Southeast $\frac{1}{4}$ of the Southeast $\frac{1}{4}$ of Section 29, Township 16 South, Range 33 East, Volusia County, Florida.

MORE PARTICULARLY DESCRIBED AS FOLLOWS:

A portion of Sections 28, 29 and 33, Township 16 South, Range 33 East, Volusia County, Florida, described as follows: From the Southwest corner of said Section 28, as the Point of Beginning, run N 01°05'03" E along the West line of said Section 28, a distance of 813.05 feet; thence departing said line, run N 88°27'19" W along the South line of the North 511 feet of the Southeast $\frac{1}{4}$ of the Southeast $\frac{1}{4}$ of said Section 29, a distance of 1332.58 feet; thence N 01°06'17" E along the West line of the East $\frac{1}{4}$ of said Section 29, a distance of 1833.85 feet; thence S 88°30'34" E along the North line of the South $\frac{1}{2}$ of said Section 29, a distance of 1331.91 feet to the West line of said Section 28; thence S 89°02'38" E along the North line of the South $\frac{1}{2}$ of said Section 28, a distance of 2004.05 feet; thence S 01°23'30" W along the East line of the West $\frac{1}{4}$ of the South $\frac{1}{2}$ of said Section 28, a distance of 194.88 feet, more or less to the center of Spruce Creek; thence run Southeasterly along the center of said Spruce Creek to the South line of said Section 28; thence S 89°43'01" E along the South line of said Section 28, a distance of 160 feet, more or less, to the East line of the West $\frac{1}{2}$ of the Northeast $\frac{1}{4}$ of said Section 33; thence S 01°27'37" W along said line a distance of 2602.74 feet; thence continue S 01°27'37" W along the East line of the Northwest $\frac{1}{4}$ of the Southeast $\frac{1}{4}$ of said Section 33, a distance of 1308.24 feet; thence S 88°58'42" E along the North line of the Southeast $\frac{1}{4}$ of the Southeast $\frac{1}{4}$ of said Section 33, a distance of 1326.60 feet to the East line of said Section 33; thence S 01°47'14" W along said East line a distance of 1309.53

Spruce Creek Donation
Volusia County
Page 1 of 2

BSM APPROVED
By SK Date 4-20-99

feet; thence N 88°55'33" W along the South line of said Section 33, a distance of 2638.24 feet; thence departing said line, run N 01°07'58" E along the West line of the Southwest ¼ of the Southeast ¼ of said Section 33, a distance of 1306.99 feet; thence N 88°58'42" W along the South line of the Northeast ¼ of the Southwest ¼ of said Section 33, a distance of 1320.96 feet; thence N 01°03'07" E along the West line of the Northeast ¼ of the Southwest ¼ and the West line of the Southeast ¼ of the Northwest ¼ of said Section 33, a distance of 2604.69 feet; thence N 88°47'09" W along the South line of the Northwest ¼ of the Northwest ¼ of said Section 33, a distance of 1324.65 feet to the West line of said Section 33; thence N 00°58'15" E along said West line, a distance of 1304.57 feet to the Point of Beginning.

LESS AND EXCEPT

The South ½ of the Southeast ¼, together with the Southerly 99.90 feet of the Northwest ¼ of the Southeast ¼, all in Section 33, Township 16 South, Range 33 East, Volusia County, Florida.

Spruce Creek Donation
Volusia County
Page 2 of 2

BSM APPROVED
By SK Date 4-20-99

EXHIBIT "B"

Book: 4864
Page: 4670
Diane M. Matousek
Volusia County, Clerk of Court

ACCEPTANCE OF TRANSFER OF TITLE TO DONATED LANDS

Board of Trustees of the Internal Improvement Trust Fund of the State of Florida hereby accepts this conveyance as a transfer of title of the real property as described in this Deed in accordance with F. S. 259.04(10)(a).

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT
TRUST FUND OF THE STATE OF FLORIDA

Judith A. Booth
(SIGNATURE OF FIRST WITNESS)

Judith A. Booth
(PRINTED, TYPED OR STAMPED NAME OF
FIRST WITNESS)

Adrienne Bellflower
(SIGNATURE OF SECOND WITNESS)

Adrienne Bellflower
(PRINTED, TYPED OR STAMPED NAME OF
SECOND WITNESS)

BY: Lynda I. Godfrey
Lynda I. Godfrey, Senior Acquisition Review Agent
DIVISION OF STATE LANDS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
as agent for and on behalf of the Board of Trustees
of the Internal Improvement Trust Fund
of the State of Florida

4-30-02
Date Signed

STATE OF Florida

COUNTY OF Leon

The foregoing instrument was acknowledged before me this 30 day of April, 2002, by Lynda I. Godfrey, Senior Acquisition Review Agent, Division of State Lands, Department of Environmental Protection, as agent for and on behalf of the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida. She is personally known to me.

(NOTARY PUBLIC SEAL)



Adrienne Bellflower
Notary Public

Adrienne Bellflower
(Printed, Typed, or Stamped Name of Notary Public)

Commission No.: DD104135

My Commission Expires: 4/4/06

APPENDIX B:
Legal Description

Legal Description:

All Blks 1 to 4 including exc 10 acres in blk 3 per mb 6 pg 106 & exc 4.6 A in st rd & blks B & C & inc vac streets adj per res 96-82 or bk 4102 pg 4393 & rip rts Palmas Grant Inc per or 4167 pg 3018-3019.

Exhibit "A"

PARCEL "A": Beginning at the intersection of R.J. Christy's south line per Map Book 7, page 33 of the Public Records of Volusia County, Florida and the westerly right of way line of U.S. Highway #1; thence S63 degrees 41'40"W, 972.5 feet along said Christy's line to the East bank of Turnbull Creek; thence N00 degrees 30'30"E, 100 feet; thence N07 degrees 29'30"W, 216.92 feet; thence N41 degrees 48'10"W, 261.71 feet; thence N12 degrees 01'50"E, 138.17 feet; thence N24 degrees 13'40"E, 362.7 feet to a point on the curve of the westerly right of way line of U.S. Highway No. 1; thence southerly along the said curve of said right of way line 868.58 feet (arc distance) to said curve's PC; thence S68 degrees 49'30"E, 190.61 feet along said Highway right of way line to the Point of Beginning. All being in the Palmas Grant, Section 38, Township 16 South, Range 33 East. EXCEPTING THEREFROM THE FOLLOWING: Commence at the intersection of the westerly right of way line of U.S. Highway No. 1 and the southerly line of R.J. Christy's property as shown on map in Map Book 7, page 33, of the Public Records of Volusia County, Florida; thence northerly along the said right of way line 550.09 feet for the Point of Beginning; thence S05 degrees 01'40"W, 331.67 feet; thence N54 degrees 17'46"W, 300 feet; thence N05 degrees 01'40"E, 331.67 feet to the westerly right of way line of said U.S. Highway No. 1; thence southerly 300.25 feet along the said westerly right of way line to the Point of Beginning. All lying and being in the Palmas Grant, Section 38, Township 16 South, Range 33 East.

AND:

PARCEL "B": Commence at the intersection of R. J. Christy's south line per Map Book 7, page 33 of the Public Records of Volusia County, Florida and the westerly right of way line of U.S. Highway No. 1; thence S63 degrees 41'40"W, 972.5 feet along said Christy's line to the East bank of Turnbull Creek; thence N00 degrees 30'30"E, 100 feet for the Point of Beginning; thence N59 degrees 29'30"W, 335.74 feet; thence N59 degrees 29'30"W, 80.52 feet; thence N00 degrees 30'30"E, 84.48 feet; thence N45 degrees 30'30"E, 127.38 feet; thence S89 degrees 29'30"E, 305.21 feet; thence S07 degrees 29'30"E, 216.92 feet to the Point of Beginning. All being in the Palmas Grant, Section 38, Township 16 South, Range 33 East. EXCEPTING THEREFROM THE FOLLOWING: Lot 7, Divito's Unrecorded Subdivision, being a portion of the Palmas Grant, Section 38, Township 16 South, Range 33 East; and being more particularly described as follows: Commence at the intersection of the R.J. Christy's south line per Map Book 7, page 33 of the Public Records of Volusia County, Florida and the westerly right of way line of U.S. Highway #1; thence S63 degrees 41'40"W, 972.50 feet along the said Christy's line to the east bank of Turnbull Creek; thence N00 degrees 30'30"E, 100.00 feet; thence N89 degrees 29'30"W, a distance of 231.37 feet for the POINT OF BEGINNING; thence continue N89 degrees 29'30"W, a distance of 124.38 feet; thence N59 degrees 29'30"W, a distance of 80.52 feet; thence N00 degrees 30'00"E, a distance of 84.48 feet; thence N45 degrees 30'30"E, a distance of 127.38 feet; thence S89 degrees 29'00"E, a distance of 104.04 feet; thence S00 degrees 30'30"W, a distance of 214.81 feet to the Point of Beginning.

AND:

PARCEL "C": Filled land being a portion of the Palmas Grant, Section 38, Township 16 South, Range 33 East and being described as follows: Commence at the intersection of R. J. Christy's south line per Map Book 7, page 33 of the Public Records of Volusia County, Florida and the westerly right of way line of U.S. Highway No. 1; thence S63 degrees 41'40"W, 972.5 feet along said Christy's line to the East bank of Turnbull Creek; thence N00 degrees 30'30"E, 100 feet; thence N07 degrees 29'30"W, a distance of 216.92 feet for the Point of Beginning; thence N89 degrees 29'30"W, a distance of 139.85 feet to the northerly edge of an existing bulkhead; thence northeasterly along said bulkhead N66 degrees 20'37"E, a distance of 55.70 feet; thence N30 degrees 05'28"E along said bulkhead, a distance of 53.12 feet; thence S41 degrees 48'10"E, a distance of 93.50 feet to the Point of Beginning.

OWNERSHIP:

VOLUSIA COUNTY HOLDS OWNERSHIP TO THE ENTIRE PARCEL
CONSISTING OF 21.38 ACRES.

DEVELOPER:

VOLUSIA COUNTY PARKS & RECREATION
123 WEST INDIANA AVENUE
DELAND, FLORIDA 32720

ENGINEER:

WILLIAM G. GRAY P.E.
COUNTY ENGINEER
123 WEST INDIANA AVENUE
DELAND, FLORIDA 32720

LEGAL DESCRIPTION:

A PORTION OF BLOCKS 24 & 25, LYING WESTERLY OF U.S. HIGHWAY NO.
1, A 160 FOOT RIGHT-OF-WAY, PALMAS GRANT SUBDIVISION AS RECORDED
IN MAP BOOK 1, PAGE 23 OF THE PUBLIC RECORDS OF VOLUSIA COUNTY
FLORIDA; AND A PORTION OF GOVERNMENT LOT 3, SECTION 23, TOWNSHIP
16 SOUTH, RANGE 33 EAST. SAID PARCEL CONTAINING 21.38 ACRES.

CONCURRENT ZONING:

A-2

VEHICULAR CIRCULATION:

DRIVEWAYS AND PARKING PATTERNS AS SHOWN.

CONNECTION TO PUBLIC RIGHT OF WAY:

THE DRIVEWAY WILL CONNECT TO U.S.1 AS SHOWN.

SEWER AND WATER CAPACITY:

SEWER: BY ON SITE SEPTIC TANK(1050 GAL),
w/500 sq.ft. ELEVATED DRAIN FIELD.(2 REQ.D.)
WATER: CENTRAL SYSTEM ON SITE.

PHASE 1

PAVILION & RESTROOMS
PLAYGROUND
CARETAKERS TRAILER
PICNIC AREA 1
PICNIC AREA 2
WATER TREATMENT PLANT
12' MOSQUITO CONTROL MAINTENANCE
ROAD & HORSE PATH
40 PARKING SPACES
PUBLIC FISHING PEIR
TENT CAMPING AREA (17 SPACES)

EXHIBIT "A"

2:471328

The Northwest 1/4 of the Southwest 1/4 and the West 430' ^{BOOK} of the Southwest 1/4 and the East 890 feet of the Southwest 1/4 ^{PAGE} of the Southwest 1/4 and the East 1/2 of the Southwest 1/4, except the East 668.9 feet of the East 1/2 of the Northeast 1/4 of the Southwest 1/4 lying North of Spruce Creek and West 1/2 of the Southeast 1/4 lying Southwest of the main run of Spruce Creek, all in Section 28, Township 16 South, Range 33 East, Public Records of Volusia County, Florida.

TOGETHER WITH

The Northwest 1/4 of the Northwest 1/4 and the East 1/2 of the Northwest 1/4 and the Northwest 1/4 of the Northeast 1/4 and the Southwest 1/4 of the Northeast 1/4, and the Northeast 1/4 of the Southwest 1/4 and Northwest 1/4 of Southeast 1/4 and South 1/2 of the Southeast 1/4, all in Section 33, Township 16 South, Range 33 East, Public Records of Volusia County, Florida.

TOGETHER WITH

All of the Northeast 1/4, of the Southeast 1/4, also the North 511 feet of the Southeast 1/4, of the Southeast 1/4, of Section 29, Township 16 South, Range 33 East, Volusia County, Florida.

MORE PARTICULARLY DESCRIBED AS FOLLOWS:

A portion of Sections 28, 29 and 33, Township 16 South, Range 33 East, Volusia County, Florida, described as follows: From the Southwest corner of said Section 28, as the Point of Beginning, run North 01 Degrees 05 Minutes 03 Seconds East along the West line of said Section 28 a distance of 813.05 feet; thence departing said line, run North 88 Degrees 27 Minutes 19 Seconds West along the South line of the North 511 feet of the Southeast 1/4 of the Southeast 1/4 of said Section 29 a distance of 1332.58 feet; thence North 01 Degrees 06 Minutes 17 Seconds East along the West line of the East 1/4 of said Section 29 a distance of 1833.85 feet; thence South 88 Degrees 30 Minutes 34 Seconds East along the North line of the South 1/2 of said Section 29 a distance of 1331.91 feet to the West line of said Section 28; thence South 89 Degrees 02 Minutes 38 Seconds East along the North line of the South 1/2 of said Section 28 a distance of 2004.05 feet; thence South 01 Degrees 23 Minutes 30 Seconds West along the East line of the West 3/4 of the South 1/2 of said Section 28 a distance of 194.88 feet, more or less to the center of Spruce Creek; thence run Southeasterly along the center of said Spruce Creek to the South line of said Section 28; thence South 89 Degrees 43 Minutes 01 Seconds East along the South line of said Section 28 a distance of 160 feet, more or less, to the East line of the West 1/2 of the Northeast 1/4 of said Section 33; thence South 01 Degrees 27 Minutes 37 Seconds West along said line a distance of 2602.74 feet; thence continue South 01 Degrees 27 Minutes 37 Seconds West along the East line of the Northwest 1/4 of the Southeast 1/4 of said Section 33 a distance of 1308.24 feet; thence South 88 Degrees 58 Minutes 42 Seconds East along the North line of the Southeast 1/4 of the Southeast 1/4 of said Section 33 a distance of 1326.60 feet to the East line of said Section 33; thence South 01 Degrees 47 Minutes 14 Seconds West along said East line a distance of 1309.53 feet; thence North 88 Degree 55 Minutes 33 Seconds West along the South line of said Section 33 a distance of 2638.24 feet; thence departing said line, run North 01 Degrees 07 Minutes 58 Seconds East along the West line of the Southwest 1/4 of the Southeast 1/4 of said Section 33 a distance of 1306.99 feet; thence North 88 Degrees 58 Minutes 42 Seconds West along the South line of the Northeast 1/4 of the Southwest 1/4 of said Section 33 a distance of 1320.96 feet; thence North 01 Degrees 03 Minutes 07 Seconds East along the West line of the Northeast 1/4 of the Southwest 1/4 and the West line of the Southeast 1/4 of the Northwest 1/4 of said Section 33 a distance of 2604.69 feet; thence North 88 Degrees 47 Minutes 09 Seconds West along the South line of the Northwest 1/4 of the Northwest 1/4 of said Section 33 a distance of 1324.65 feet to the West line of said Section 33; thence North 00 Degrees 58 Minutes 15 Seconds East along said West line a distance of 1304.57 feet to the Point of Beginning.

Containing 611.48 acres, more or less.

Subject to Right of Way Easement recorded in Deed Book 290, Page 345, Public Records of Volusia County, Florida. B-5

Subject to Right of Way Easement recorded in Official Records Book 199, Page

27471329

BOOK PAGE
VOLUME 2 INTY
FILE 24

EXHIBIT "A" CONTINUED

A portion of Sections 3 and 4, Township 17 South, Range 33 East, Volusia County, Florida, described as follows:

From the Northeast corner of said Section 4, run South 89 Degrees 08 Minutes 30 Seconds West along the North line of said Section 4 a distance of 506.98 feet to the Point of Beginning of the centerline of a 60 foot access and utility easement, being 30.00 feet on each side of the following described centerline; thence South 01 Degrees 07 Minutes 00 Seconds West, parallel with the East line of said Section 4 a distance of 1839.26 feet to the P.C. of a curve, concave Northeast, having a radius of 675.00 feet and a central angle of 54 Degrees 31 Minutes 26 Seconds; thence run Southerly along the arc of said curve a distance of 642.34 feet; thence South 53 Degrees 24 Minutes 26 Seconds East a distance of 350.00 feet to the centerline of Turnbull Bay Road and the termination of said centerline.

EXHIBIT "A" (CONTINUED)

The South $\frac{1}{2}$ of the Southeast $\frac{1}{4}$, together with the Southerly 99.90 feet of the Northwest $\frac{1}{4}$ of the Southeast $\frac{1}{4}$, all in Section 33, Township 16 South, Range 33 East, Volusia County, Florida.

Also a portion of Sections 3 and 4, Township 17 South, Range 33 East, Volusia County, Florida, described as follows:

From the Northeast corner of said Section 4, run South 89 Degrees 08 Minutes 30 Seconds West along the North line of said Section 4 a distance of 506.98 feet to the Point of Beginning of the centerline of a 60 foot access and utility easement, being 30.00 feet on each side of the following described centerline; thence South 01 Degrees 07 Minutes 00 Seconds West, parallel with the East line of said Section 4 a distance of 1839.26 feet to the P.C. of a curve, concave Northeast, having a radius of 675.00 feet and a central angle of 54 Degrees 31 Minutes 26 Seconds; thence run Southerly along the arc of said curve a distance of 642.34 feet; thence South 53 Degrees 24 Minutes 26 Seconds East a distance of 350.00 feet to the centerline of Turnbull Bay Road and the termination of said centerline.

SUBJECT to Right of Way Easement in Deed Book 290, Page 345, Public Records of Volusia County, Florida.

SUBJECT to Florida Power & Light Easement recorded in Deed Book 199, Page 186, Public Records of Volusia County, Florida.

SUBJECT to certain boundary line agreement between Darrell S. Ozier and Catherine C. Goodrich, recorded in Official Records Book 1892, Page 1727, Public Records of Volusia County, Florida.

SUBJECT to Right of Way in favor of Florida Gas Company, as recorded in Official Records Book 579, Page 685, Public Records of Volusia County, Florida.

SUBJECT to Right of Way of Martin Dairy Road.

SUBJECT to matters contained in that Special Warranty Deed from Berrien Becks, Sr. and Berrien Becks, Jr. to B. H. Oates, Jr., as recorded in Official Records Book 2781, Page 462, Public Records of Volusia County, Florida.

EXHIBIT "A"

PARCEL NUMBER 1

THAT PART OF U.S. LOTS 1 AND 3, SECTION 23, TOWNSHIP 16 SOUTH, RANGE 33 EAST, LYING WEST OF U.S. HIGHWAY NO. 1, U.S. LOT 2, SECTION 23, TOWNSHIP 16 SOUTH, RANGE 33 EAST, U.S. LOTS 1, 4 AND 5, SECTION 22, TOWNSHIP 16 SOUTH, RANGE 33 EAST. THAT PART OF U.S. LOTS 2 AND 3, SECTION 22, TOWNSHIP 16 SOUTH, RANGE 33 EAST LYING EAST OF FLORIDA EAST COAST RAILWAY. THAT PART OF THE NORTHWEST 1/4 OF SECTION 22, TOWNSHIP 16 SOUTH, RANGE 33 EAST, LYING EAST OF THE FLORIDA EAST COAST RAILWAY. EXCEPTING THEREFROM THE FOLLOWING DESCRIBED PROPERTY IN LOT 1, SECTION 23, TOWNSHIP 16 SOUTH, RANGE 33 EAST: BEGIN AT A POINT ON THE WEST BOUNDARY OF U.S. NO. 1 HIGHWAY, WHERE THE SAME IS INTERSECTED BY THE SOUTHERLY SHORE OF ROSE BAY AT HIGHWATER MARK, THENCE SOUTHERLY ALONG THE WEST BOUNDARY OF SAID HIGHWAY 295.11 FEET, THENCE WESTERLY AND AT RIGHT ANGLES TO SAID HIGHWAY 295.11 FEET TO A CONCRETE MONUMENT, THENCE NORTHWESTERLY AND PARALLEL TO SAID HIGHWAY 295.11 FEET TO A POINT IN ROSE BAY, THENCE 295.11 FEET TO THE POINT OF BEGINNING, EXCEPT THAT PART NOW IN HIGHWAY NO. 1.

PARCEL NUMBER 9

PARCEL "A" - OFFICIAL RECORDS BOOK 2433, PAGE 353, PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA; SECTION 28, TOWNSHIP 16 SOUTH, RANGE 33 EAST; SOUTHWEST 1/4 OF NORTHWEST 1/4 LYING SOUTH AND WEST OF CREEK, SECTION 29, TOWNSHIP 16 SOUTH, RANGE 33 EAST; NORTHEAST 1/4 SOUTH OF SPRUCE CREEK, ALL LOCATED IN VOLUSIA COUNTY, FLORIDA, EXCEPTING THEREFROM PARCEL "B" OF OFFICIAL RECORDS BOOK 1274, PAGE 552, PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA: THAT PART OF: SOUTHWEST 1/4 OF NORTHEAST 1/4, SOUTH OF SPRUCE CREEK, OF SECTION 29, TOWNSHIP 16 SOUTH, RANGE 33 EAST, LYING WESTERLY OF A LINE DESCRIBED AS FOLLOWS: COMMENCE ON THE SOUTH BOUNDARY OF SECTION 29, TOWNSHIP 16 SOUTH, RANGE 33 EAST AT A POINT 1492.50 FEET WEST FROM THE SOUTHEAST CORNER THEREOF, RUN THENCE NORTH 23 DEGREES 23 MINUTES 50 SECONDS WEST, 2244.30 FEET; THENCE NORTH 66 DEGREES 36 MINUTES 10 SECONDS EAST, 250 FEET TO THE POINT OF BEGINNING; RUN THENCE NORTH 13 DEGREES 36 MINUTES 19 SECONDS EAST, 1770 FEET, MORE OR LESS, TO THE MIDDLE OF SPRUCE CREEK, AND THE END OF THE LINE AS HEREIN DESCRIBED.

PARCEL NUMBER 4

THE PALMAS GRANT ALSO KNOWN AS SECTION 33, TOWNSHIP 16 SOUTH, RANGE 33 EAST, EXCEPTING THEREFROM THE FOLLOWING PARTS: LOT 6 IN BLOCK 11; THAT PART OF LOTS 1 AND 2 IN BLOCK 13, LYING EAST OF WHAT IS COMMONLY KNOWN AS THE SAW GRASS MARSH; LOTS 1 AND 2 AND 3, IN BLOCK 14; AND THE WEST 1/2 OF LOT 1 IN BLOCK 13; AND THAT PARCEL OF LAND HERETOFORE CONVEYED TO THE FLORIDA EAST COAST AND GULF RAILROAD CO., (NOW OWNED BY THE FLORIDA EAST COAST RAILROAD) ON OCTOBER 5, 1892, SAID EXCEPTED TRACTS AND THE BLOCKS AND LOTS ABOVE NAMED ARE KNOWN AS LOTS AND BLOCKS IN A PLAT OF THE PALMAS GRANT RECORDED IN MAP BOOK 1, PAGE 23, OF THE PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA, AND ALSO EXCEPTING THEREFROM A PORTION OF THE PALMAS GRANT, KNOWN AS THAT PORTION OF LOT OR BLOCK 24, CONNERAT'S SUBDIVISION OF SAID PALMAS GRANT, BEING MORE PARTICULARLY DESCRIBED AS BEGINNING AT A POINT IN THE WEST LINE OF U.S. HIGHWAY NO. 1, ALSO KNOWN AS DIXIE HIGHWAY AND BEING 200 FEET WIDE AS NOW LAID OUT AND OCCUPIED; SAID POINT BEING A DISTANCE OF 1960 FEET SOUTHERLY

EXHIBIT "A" (CONTINUED)

OF, AS MEASURED AT RIGHT ANGLES, TO THE NORTH LINE OF SAID PALMAS GRANT; THENCE SOUTH 14 DEGREES 40 MINUTES 30 SECONDS EAST ALONG SAID WEST LINE OF U.S. HIGHWAY NO. 1 (DIXIE HIGHWAY) A DISTANCE OF 250 FEET TO A POINT THEREIN; THENCE SOUTH 60 DEGREES 00 MINUTES 00 SECONDS WEST, A DISTANCE OF 161 FEET MORE OR LESS TO A HIGH WATER MARK OF SPRUCE CREEK; THENCE NORTHERLY ALONG SAID HIGH WATER MARK A DISTANCE OF 275 FEET MORE OR LESS, TO A POINT IN A LINE PARALLEL TO AND 1960 FEET SOUTHERLY AS MEASURED AT RIGHT ANGLES, FROM SAID NORTH LINE OF PALMAS GRANT; THENCE NORTH 60 DEGREES EAST, ALONG SAID PARALLEL LINE A DISTANCE OF 100 MORE OR LESS TO A POINT OF BEGINNING AND ALSO EXCEPTING THEREFROM THAT CERTAIN 10 ACRES OF THE PLOT KNOWN AS "BLACK HAMMOCK", WHICH 10 ACRES ARE BOUNDED ON THE EAST BY THE HIGHWAY OR ROAD WHICH RUNS FROM NEW SMYRNA TO DAYTONA, ON THE NORTH BY SAME HIGHWAY AND BY SPRUCE CREEK, ON THE WEST BY SPRUCE CREEK AND TURNBULL BAY, AND ON THE SOUTH BY OTHER LAND OF PALMAS GRANT. ALSO EXCEPTING THEREFROM THE RIGHT OF WAY OF U.S. HIGHWAY NO. 1 AS NOW LAID OUT AND ESTABLISHED. ALSO EXCEPTING ALL LAND EAST OF U.S. HIGHWAY NO. 1; ALSO EXCEPTING ALL LAND WEST OF THE FLORIDA EAST COAST RAILROAD NORTH OF SPRUCE CREEK AND ALSO EXCEPTING ALL LAND SOUTH OF SPRUCE CREEK EAST OF TURNBULL BAY ALL OF SAID LAND WITHIN THE PALMAS GRANT.

AND ALSO EXCEPTING:

A PORTION OF BLOCKS 24 AND 25, LYING WESTERLY OF U.S. HIGHWAY NO. 1, A 160 FOOT RIGHT OF WAY, PALMAS GRANT SUBDIVISION AS RECORDED IN MAP BOOK 1, PAGE 23, OF THE PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA; AND A PORTION OF GOVERNMENT LOT 3, SECTION 23, TOWNSHIP 16 SOUTH, RANGE 33 EAST AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCE AT THE NORTHEAST CORNER OF THE SAID PALMAS GRANT PER DEPARTMENT OF TRANSPORTATION RIGHT OF WAY MAPS. THENCE S 59°12'35" W, ALONG THE NORTH LINE OF SAID PALMAS GRANT, 710.79 FEET TO THE NORTHWESTERLY RIGHT OF WAY LINE OF U.S. HIGHWAY NO. 1 SAID POINT BEING N 59°12'35" E, .7 FEET FROM A FOUND CONCRETE MONUMENT ON THE SAID PALMAS GRANT LINE. THENCE S 01°05'04" W, ALONG THE WESTERLY RIGHT OF WAY LINE OF SAID U.S. HIGHWAY NO. 1, 449.03 FEET TO THE POINT OF BEGINNING; THENCE CONTINUE S 01°05'04" W, 754.86 FEET; THENCE ALONG A WETLANDS LINE AS LOCATED BY THE VOLUSIA COUNTY ENVIRONMENTAL DEPARTMENT THE FOLLOWING COURSES AND DISTANCES: N 51°14'31" W, 59.41 FEET; THENCE N 09°48'24" E, 22.34 FEET; THENCE N 08°24'49" W, 17.09 FEET; THENCE N 37°27'10" W, 39.89 FEET; THENCE N 17°34'37" E, 54.43 FEET; THENCE N 77°59'03" E, 18.65 FEET; THENCE N 12°41'49" E, 46.89 FEET; THENCE N 20°33'31" W, 36.92 FEET; THENCE N 03°11'47" E, 69.28 FEET; THENCE N 11°00'57" W, 58.82 FEET; THENCE N 28°37'59" W, 53.34 FEET; THENCE N 46°02'53" E, 36.86 FEET; THENCE N 85°35'44" W 34.46 FEET; THENCE S 52°06'38" W, 45.03 FEET; THENCE N 41°22'25" W, 55.36 FEET; THENCE S 03°44'33" W, 72.99 FEET; THENCE S 68°27'07" W, 77.06 FEET; THENCE S 05°21'34" E, 41.28 FEET; THENCE S 45°01'49" E, 47.46 FEET; THENCE S 14°22'22" W, 54.49 FEET; THENCE S 01°53'25" E, 54.31 FEET; THENCE S 21°01'39" E, 44.62 FEET; THENCE S 00°26'23" E, 70.32 FEET; THENCE S 54°00'46" W, 43.72 FEET; THENCE S 34°19'15" W, 83.75 FEET; THENCE S 14°14'25" E, 34.71 FEET; THENCE S 18°33'42" W, 38.56 FEET; THENCE S 09°34'15" E, 72.08 FEET; THENCE S 40°23'55" E, 25.89 FEET; THENCE S 52°41'29" W, 57.61 FEET; THENCE S 72°58'04" W, 41.55 FEET; THENCE S 09°45'32" E 50.10 FEET; THENCE S 33°03'22" E, 35.36 FEET; THENCE S 25°03'54" W, 26.72 FEET; THENCE S 73°21'26" W, 47.51 FEET; THENCE N 79°12'06" W 53.11 FEET; THENCE S 32°05'01" W, 27.61 FEET; THENCE S 72°11'00" E, 39.93 FEET; THENCE S 23°39'57" E, 45.33 FEET; THENCE S 18°24'28" W, 34.01 FEET; THENCE S 81°35'48" W, 64.17 FEET; THENCE N 77°54'30" W, 33.29 FEET; THENCE S 67°23'23" W, 34.67 FEET; THENCE N 65°47'33" W, 62.75 FEET; THENCE N 74°10'59" W, 33.19 FEET;

EXHIBIT "A" (CONTINUED)

THENCE N 09°29'55" W, 48.18 FEET; THENCE N 40°34'52" W, 52.80 FEET; THENCE N 40°55'44" W, 66.27 FEET; THENCE N 53°56'08" W, 63.80 FEET; THENCE N 26°30'18" W, 39.47 FEET; THENCE N 32°50'35" W, 41.11 FEET; THENCE N 34°55'30" W, 169.43 FEET; THENCE N 33°41'56" W, 92.53 FEET; THENCE N 40°04'03" W, 45.87 FEET; THENCE N 52°05'17" W, 51.41 FEET; THENCE N 18°02'44" W, 35.37 FEET; THENCE N 09°15'08" E, 69.20 FEET; THENCE N 08°50'07" E, 53.18 FEET; THENCE N 03°00'10" E, 43.53 FEET; THENCE N 38°48'46" E, 36.62 FEET; THENCE N 06°45'33" E, 70.01 FEET; THENCE N 25°11'18" W 77.84 FEET; THENCE N 00°34'51" W, 79.72 FEET; THENCE N 01°17'24" W, 62.60 FEET; TO THE SAID NORTH LINE OF THE PALMAS GRANT; THENCE N 01°17'24" W, 13.25 FEET; THENCE N 24°09'52" W, 60.85 FEET; THENCE N 02°18'43" E, 62.79 FEET; THENCE N 07°11'38" W, 33.53 FEET; THENCE N 18°56'19" E, 32.93 FEET; THENCE N 12°05'34" W, 37.91 FEET; THENCE N 16°45'13" E, 56.50 FEET; THENCE N 10°07'15" E, 53.71 FEET; THENCE N 46°29'56" E, 26.76 FEET; THENCE S 65°53'18" E, 62.66 FEET; THENCE N 53°32'20" E, 45.25 FEET; THENCE N 39°56'09" E, 48.85 FEET; THENCE N 62°37'18" E, 44.19 FEET; THENCE N 80°12'52" E, 33.29 FEET; THENCE S 78°10'31" E, 36.77 FEET; THENCE S 34°19'53" E, 30.02 FEET; THENCE S 58°09'16" E, 61.04 FEET; THENCE S 40°21'37" W, 53.72 FEET; THENCE S 69°47'21" W, 40.74 FEET; THENCE S 07°54'59" W, 31.08 FEET; THENCE S 21°50'13" E, 51.40 FEET; THENCE S 79°38'15" E, 48.81 FEET; THENCE S 24°54'01" E, 25.92 FEET; TO THE SAID NORTH LINE OF THE PALMAS GRANT; THENCE S 24°54'01" E, 20.73 FEET; THENCE S 43°30'03" W, 28.00 FEET; THENCE N 80°23'56" E, 47.00 FEET; THENCE S 65°15'45" E, 38.00 FEET; THENCE S 75°33'57" E, 45.98 FEET; THENCE N 77°57'27" E, 33.70 FEET; THENCE S 86°51'24" E, 62.12 FEET; THENCE N 71°07'43" E, 37.53 FEET; THENCE N 61°38'46" E, 122.13 FEET; THENCE S 79°56'05" E, 35.51 FEET; THENCE S 57°34'43" E, 49.71 FEET; THENCE S 45°09'18" E, 85.20 FEET; THENCE N 80°37'21" E, 45.54 FEET; THENCE S 47°04'29" E, 42.68 FEET; THENCE S 02°52'05" E, 31.14 FEET; THENCE S 11°31'02" W, 48.19 FEET; THENCE S 88°53'30" E, 54.10 FEET; THENCE N 44°43'30" E, 42.64 FEET; THENCE N 06°03'48" E, 47.80 FEET; THENCE N 23°34'06" E, 63.12 FEET TO THE POINT OF BEGINNING.

AND ALSO EXCEPTING

A PORTION OF SAID PALMAS GRANT BEING MORE PARTICULARLY DESCRIBED AS
FOLLOWS:

COMMENCE AT THE SOUTHWEST CORNER OF THE PALMAS GRANT, RUN ALONG THE SOUTHERLY LINE OF SAID PALMAS GRANT, N 60°34'28" E, 631.90 FEET TO THE POINT OF BEGINNING; THENCE N 14°03'22" W, 1354.64 FEET; THENCE N 30°01'19" W, 673.31 FEET; THENCE S 60°34'28" W, 40.01 FEET; TO THE SOUTHEAST CORNER OF LOT 2, BLOCK 13, SAID PALMAS GRANT; THENCE ALONG THE EASTERLY LINE OF LOTS 1 AND 2, SAID BLOCK 13, N 30°45'33" W, 330.00 FEET; THENCE N 60°34'28" E, 100.03 FEET; THENCE S 30°45'33" E, 323.99 FEET; THENCE S 30°01'19" E, 627.45 FEET, TO THE WESTERLY RIGHT OF WAY LINE OF THE FLORIDA EAST COAST RAILWAY; THENCE ALONG SAID RIGHT OF WAY, S 21°32'42" E, 115.35 FEET; THENCE S 14°03'22" E, 1284.75 FEET, TO THE SAID SOUTHERLY LINE OF THE PALMAS GRANT; THENCE ALONG SAID SOUTHERLY LINE S 60°34'28" W, 62.23 FEET, TO THE POINT OF BEGINNING.

AND ALSO EXCEPTING:

A PORTION OF SAID PALMAS GRANT BEING MORE PARTICULARLY DESCRIBED AS
FOLLOWS:

COMMENCE AT THE SOUTHWEST CORNER OF THE PALMAS GRANT, RUN N 07°39'46" W, 2341.78 FEET, TO A POINT ON THE NORTHERLY LINE OF LOT 8, BLOCK 8 OF SAID PALMAS GRANT, BEING THE POINT OF BEGINNING; THENCE ALONG SAID NORTHERLY LINE OF LOT 8, S 60°34'25" W, 70.00 FEET TO THE SOUTHEAST CORNER OF LOT 3, BLOCK 14, OF SAID PALMAS GRANT; THENCE ALONG THE EASTERLY LINE OF SAID LOT 3, N 29°18'53" W,

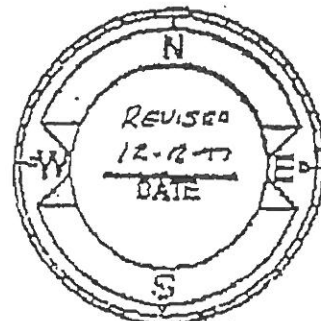
EXHIBIT "A" (CONTINUED)

711.25 FEET TO THE MEAN HIGH WATER LINE OF SPRUCE CREEK; THENCE ALONG SAID MEAN HIGH WATER LINE THE FOLLOWING TWO COURSES AND DISTANCES (1) S 58°22'46" E, 86.97 FEET, (2) N 78°31'25" E, 29.15 FEET; THENCE S 29°13'53" E, 626.30 FEET; TO THE POINT OF BEGINNING.

PARCEL 3:

A PORTION OF BLOCKS 24 AND 25 AND A PORTION OF A VACATED 30 FOOT RIGHT OF WAY UNOPENED AND UNUSED LYING BETWEEN BLOCKS 24 AND 25, PALMAS GRANT SUBDIVISION OF SECTION 38, TOWNSHIP 16 SOUTH, RANGE 33 EAST, AS SHOWN IN MAP BOOK 1, PAGE 23 OF THE PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA, LYING EAST OF U.S. HIGHWAY #1, (160 FOOT RIGHT OF WAY AS NOW OCCUPIED) BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS: AS A POINT OF REFERENCE COMMENCE AT THE INTERSECTION OF THE NORTH LINE OF PALMAS GRANT, SECTION 38, TOWNSHIP 16 SOUTH, RANGE 33 EAST, WITH THE EASTERLY LINE OF U.S. HIGHWAY #1, (160 FOOT RIGHT OF WAY); THENCE SOUTH 01 DEGREES 05 MINUTES 04 SECONDS WEST ALONG THE EASTERLY LINE OF U.S. HIGHWAY #1 A DISTANCE OF 1583.55 FEET TO A POINT OF CURVATURE; THENCE ALONG A CURVE TO THE LEFT HAVING A RADIUS OF 3045.36 FEET AND THROUGH A CENTRAL ANGLE OF 01 DEGREES 30 MINUTES 18 SECONDS A DISTANCE OF 80.00 FEET TO THE POINT OF BEGINNING; THENCE CONTINUE ALONG SAID CURVE TO THE LEFT HAVING A RADIUS OF 3045.36 FEET AND THROUGH A CENTRAL ANGLE OF 07 DEGREES 25 MINUTES 10 SECONDS A DISTANCE OF 394.35 FEET TO A POINT; THENCE NORTH 82 DEGREES 09 MINUTES 39 SECONDS EAST A DISTANCE OF 20.00 FEET TO A POINT ON A CURVE; THENCE FROM A TANGENT BEARING OF SOUTH 07 DEGREES 49 MINUTES 42 SECONDS EAST ALONG A CURVE TO THE LEFT HAVING A RADIUS OF 3025.36 FEET AND THROUGH A CENTRAL ANGLE OF 06 DEGREES 47 MINUTES 36 SECONDS A DISTANCE OF 358.71 FEET TO A POINT ON THE MEAN HIGH WATERLINE OF ROSE BAY; THENCE IN A NORTHEASTERLY DIRECTION ALONG A MEAN HIGH WATER LINE A DISTANCE OF 745.00 FEET TO A POINT; THENCE NORTH 88 DEGREES 54 MINUTES 56 SECONDS WEST, A DISTANCE OF 285.00 FEET TO THE POINT OF BEGINNING.

LOTS 3 AND 4, BLOCK 12, LYING WEST OF THE RIGHT OF WAY OF THE FLORIDA EAST COAST RAILWAY, DOUGLAS MAP AND SUBDIVISION OF PALMAS GRANT, LOCATED IN SECTION 38, TOWNSHIP 16, SOUTH, RANGE 33 EAST, AS PER PLAT THEREOF RECORDED IN MAP BOOK 1, PAGE 23, PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA.



APPENDIX C:

DEP Approved Management Prospectus – Includes Optimum Boundary Map

Spruce Creek

Volusia County

Substantially Complete

Purpose for State Acquisition

Natural areas along the coast of Volusia County are becoming scarce as residential developments expand from Daytona Beach and New Smyrna Beach. The Spruce Creek project protects one of the largest tracts of undeveloped land left in this region along the estuary of Spruce Creek and helps to maintain the water quality of the creeks and bays here, thus protecting a fishery. Additionally, this project will conserve what may be the site of Andrew Turnbull's 18th-century plantation and provide a recreational area where people can do anything from hiking and fishing to simply learning about the plants and animals of this scenic landscape.

Manager

Volusia County.

General Description

The original Spruce Creek project area, north and west of Strickland Bay, contains good estuarine tidal swamps, hammocks, scrub, and flatwoods. It protects habitat for such endangered or threatened species as bald eagles, wood storks and manatees. The addition, between U.S. 1 and Turnbull Bay, contains good Maritime or Xeric Hammock, with live oaks, cabbage palms, and several tropical shrubs near their northern limits. Flatwoods also cover a large part of the addition, and tidal marsh with remnants of black mangrove fringes it. Disturbed areas include an historic house at the north end and the remains of a fish camp and marina east of U.S. 1. No FNAI-listed plants are known from the addition; of FNAI-listed animals, gopher tortoises have been found. The area is adjacent to several Outstanding

Florida Waters, and the aquatic resources are important to both recreational and commercial fisheries. There are two archaeological sites recorded within the project area: Spruce Creek Mound site, a prehistoric and historic burial mound; and J. D. site, a prehistoric and historic shell midden and burial site. The project may also contain historic archaeological sites related to the British Colonial Period occupation in this area of NE Florida (ca. 1763–1783 AD). The area is experiencing significant growth, so developable acreage is likely to be lost relatively soon.

Public Use

This project is designated as a recreation area with uses such as cultural and environmental education, hiking, fishing, camping and picnicking.

Acquisition Planning

On December 1, 1989, the Land Acquisition Advisory Council (LAAC) added the original Spruce Creek project to the CARL Priority list. This fee-simple acquisition, sponsored by Volusia County, consisted of approximately 1,718 acres, nine owners, and a 1989 taxable value of \$2,675,000. On December 7, 1990, an owner sponsored 54-acre parcel was added to the boundary. The project was removed on December 10, 1992 due to unwilling sellers. At that time, it was less than 90% complete.

On December 6, 1994, LAAC added the current Spruce Creek project to the 1995 CARL Priority list. This

Placed on List	1990*
Project Area (Acres)	2,831
Acres Acquired	2,289**
at a Cost of	\$19,118,050**
Acres Remaining	542
with Estimated (Tax Assessed) Value of \$10,068,445	

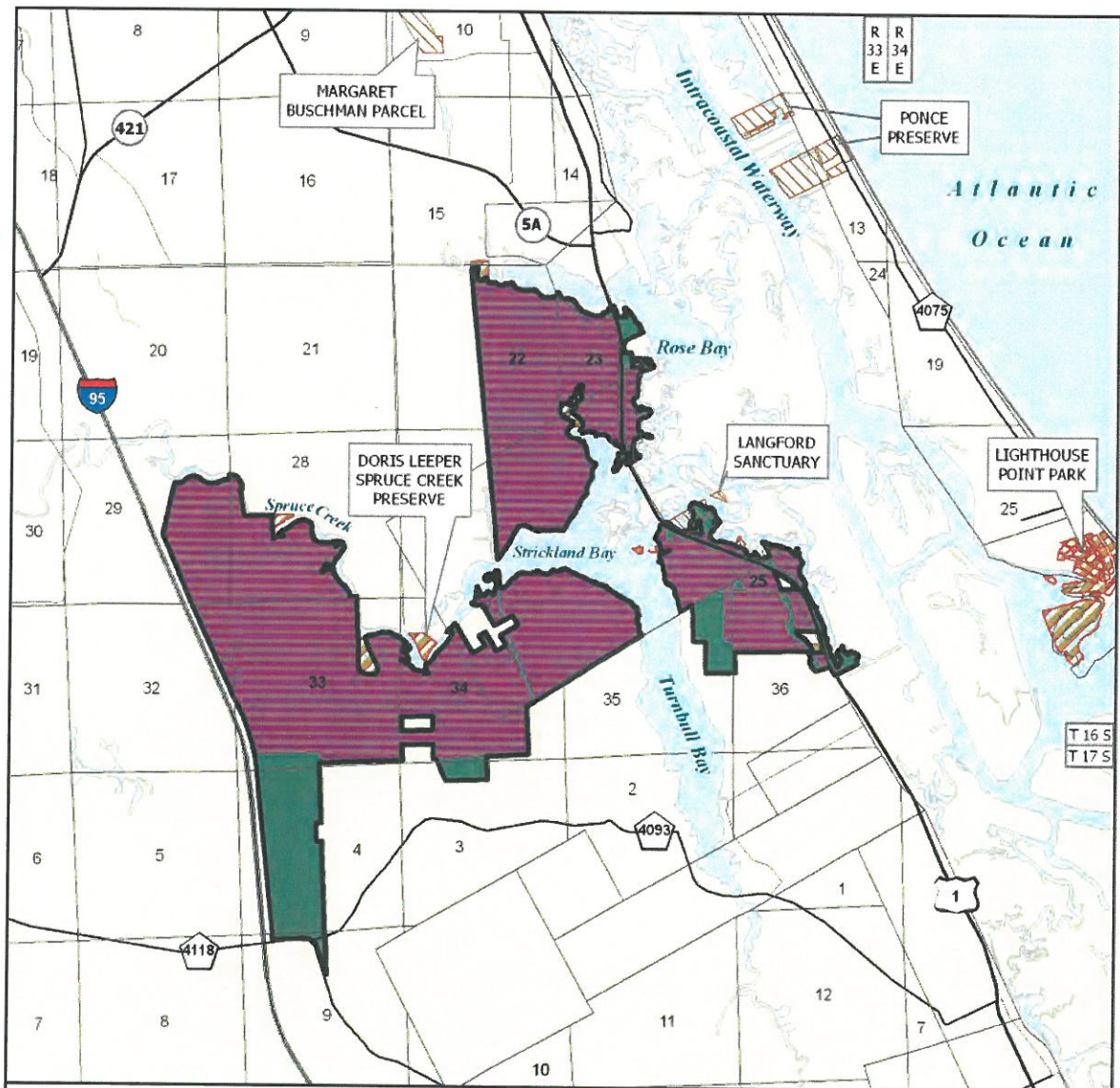
* Combined with Spruce Creek Addition in 1994

**includes funds spent and acreage acquired by BOT, SJRWMD, Volusia County, and the City of Port Orange.

Note: 97 acres removed 10/2009 due to residential/commercial/infrastructure development.


Spruce Creek FNAI Elements	
Florida Scrub-jay	G2/S2
Gopher Tortoise	G3/S3
Florida Beargrass	G3/S3
Bald Eagle	G5/S3
4 rare species are associated with the project	

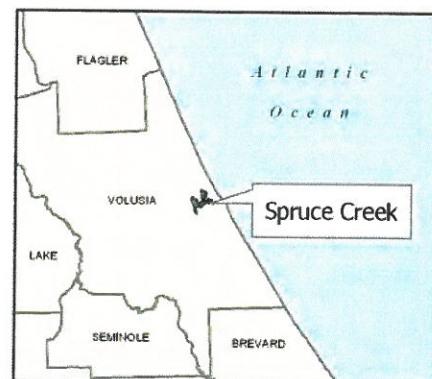
Spruce Creek



SPRUCE CREEK

VOLUSIA COUNTY

-  Florida Forever BOT Project Boundary
-  Acquired for Conservation (Fee Simple)
-  Essential Parcel(s) Remaining
-  State Owned Lands
-  Other Conservation Lands



OCTOBER 2009

Spruce Creek

fee-simple acquisition, sponsored by Volusia County, consisted of a 208-acre portion of the original project and a 316-acre addition totaling 524 acres, multiple owners, and a 1993 taxable value of \$2,124,141. The project boundary, however, included the portions of the project that had already been acquired. The resulting project acreage equaled 1,593 acres with a taxable value of \$3,406,991.

On October 24, 2002, the Acquisition & Restoration Council (ARC) approved a fee-simple 648-acre addition to the project boundary. It was sponsored by Volusia County, consisted of five owners, and a 2002 taxable value of \$1,297,592.

On October 10, 2006, the St. Johns River Water Management District (SJRWMD), in partnership with Volusia County, closed on a 40-acre parcel known as the Eubank/Rosier tract. The total purchase price was \$915,535.

In August 2007, Volusia County acquired 7.08 acres from the Blanchette family.

In December 2007, the City of Port Orange acquired 225 acres on the western boundary from ICI.

On September 19, 2008, the SJRWMD acquired 58.02 acres from the Ford family.

On October 9, 2009, ARC voted to remove 6 sites with 54 individual parcels (97 acres) containing residential and commercial buildings or infrastructure. The total acreage has a just tax-assessed value of \$9,166,381.

Coordination

Volusia County is a partner in the acquisition of this project as well as the manager. SJRWMD and City of Port Orange are acquisition partners also.

Management Policy Statement

The primary goals of management of the Spruce Creek project are to conserve, protect, manage, or restore important ecosystems, landscapes, and forests, in order to enhance or protect significant surface water, coastal, recreational, timber, fish or wildlife resources which local or state regulatory programs cannot adequately protect; to provide areas, including recreational trails, for natural-resource-based recreation; and to preserve significant archaeological or historical sites.

Management Prospectus

Qualifications for state designation The Spruce Creek Recreation Area has the size, natural, cultural, and recreational resources, and surrounding population density to qualify as a State Recreation Area.

Manager Volusia County in cooperation with the State of Florida.

Conditions affecting intensity of management The project includes moderate-need tracts requiring more than basic resource management and protection. These lands will contain more highly developed resource-related recreation facilities. Large portions of the property, however, would be considered low-need tracts requiring only basic resource management and protection. Recreation use will be incorporated but in a more dispersed and less intensive manner.

Timetable for implementing management and provisions for security and protection of infrastructure

Within the first year after acquisition, management activities will concentrate on site security and resource inventory. Volusia County will provide appropriate access to the site to maintain existing and historic uses while protecting sensitive resources on the site. The site's natural resources and listed plants and animals will be inventoried, recreational opportunities and uses identified, and a management plan formulated.

Long-range plans for Spruce Creek will be specified in the management plan and will generally be directed as follows: Development of recreational facilities, a comprehensive trail management program, a comprehensive educational and interpretive program, and a comprehensive historic resource management program; restoration of disturbed areas; maintenance of natural communities through a program of selected harvest and fire management; and habitat enhancement for listed species.

Revenue-generating potential will be determined by the concepts in the Management Plan. Some revenues will probably be generated by user and concession fees at recreation sites. Some revenues may be generated through sale of forest products, but any such revenues will be minimal. Use of small portions of the area as mitigation for development elsewhere would not only restore damaged areas on-site, but would yield revenue as well. It will be several years before potential revenue sources could be fully developed.

Cooperators in management activities Port Orange and New Smyrna Beach both will be involved in the planning of the project.

Spruce Creek

The Museum of Arts and Sciences and the Atlantic Center for the Arts may prove to be valuable partners in optimizing the educational and interpretive opportunities on this site.

The Nature Conservancy still owns the 150 acres that is managed by the Museum of Arts and Sciences. The Environmental Council and Sierra Club have played important roles in the early protection of the creek in-

cluding sponsoring OFW status in 1986. The Southeast Volusia Historical Society and Volusia Anthropological Society have had long-standing interest in protection and interpretation of the cultural, historical and archaeological resources located on the project site. Volunteers will be invaluable in developing, managing, and interpreting this site.

Management Cost Summary

Category Source of Funds	1996/97 Volusia County	1997/98 Volusia County	1998/99 Volusia County
Salary	\$6,240	\$6,240	\$6,240
OPS	\$0	\$0	\$7,712
Expense	\$0	\$0	\$0
OCO	\$0	\$0	\$0
FCO	\$0	\$0	\$0
TOTAL	\$6,240	\$6,240	\$13,952

APPENDIX D:
Public Involvement

Doris Leeper Spruce Creek Preserve

Management Plan Advisory Group County – Council Appointed Members

MPAG:

Jack Hayman – County Council
Tim Bayle – Parks, Recreation and Culture – Preserve Manager
Randall Sleister – Land Acquisition and Management – Preserve Co-Manager
Wanda Van Dam – Environmental Representative – Volusia Forever
Barbara Coomber – Local Citizen – Volusia Forever
Mary Prevatte – Soil and Water Conservation District

Staff Present for MPAG & Public Hearing:

Volusia County Staff:

Bobbie Bryant – Parks - Activities
Julie Scofield – Parks Historic Preservation Officer
Stuart Jones – Land Acquisition and Management – Forestry
Richard Harris – Land Acquisition and Management – Biologist
Doug Weaver – Land Acquisition and Management – Director
Jeanette Munson – Land Acquisition and Management

Private:

Danny Young – Consultant – Zev Cohen & Associates, Inc.

Elected Officials:

Joie Alexander – County Council

**MINUTES
DORIS LEEPER SPRUCE CREEK PRESERVE
MANAGEMENT PLAN ADVISORY GROUP
PUBLIC MEETING**

Monday, December 6, 2010

6:00p.m.

ATLANTIC CENTER FOR THE ARTS
1414 ART CENTER AVENUE, NEW SMYRNA BEACH, FL 32168-5560

Group Members in Attendance:

Tim Baylie, Lead Managing Agency (Parks, Recreation and Culture)
Randall Sleister, Co-Managing Agency (Land Acquisition and Management)
Barbara Coomber, Local Property Owner
Jack Hayman, Local Elected Official (County Council)
Wanda Van Dam, Local Conservation Group (Sierra Club)

Absent Group Member(s):

Mary Prevatte, Soil and Water Conservation District

Meeting Called to Order

Bill Korn, Moderator, called the meeting to order at 6:02p.m.

Bill Korn, Moderator, gathered the members of the MPAG to explain that Section 259.032 F.S. requires that an individual management plan shall be developed for state owned lands consisting of over 160 acres. This statute also requires a minimum of one public hearing and input from an advisory group. He then explained the Florida Sunshine Law, which in brief instructs members of a governmental body or group in a decision-making capacity not to discuss agenda items outside the publicly noticed meeting. He further explained that the MPAG's role for the Public Hearing beginning at 6:30pm would be to listen to public comments. The Lead Managing Agency (Parks, Recreation and Culture) along with supporting County staff would handle the responses to public comments tonight. The MPAG's chair would be responsible for conducting the public hearings/meetings. At the Public Meeting scheduled for 9:30a.m., Wednesday, December 8, 2010, the MPAG would review all public comments and make recommendations to the Lead Managing Agency to assist with the preparation of a management plan for the Doris Leeper Spruce Creek Preserve. This management plan would then be presented to the County Council for approval, and subsequently submitted to the Division of State Lands for approval by the Acquisition and Restoration Council.

Adjournment -

Having no further business, the meeting adjourned at 6:10p.m upon unanimous consent of the MPAG.

**MINUTES
DORIS LEEPER SPRUCE CREEK PRESERVE
MANAGEMENT PLAN ADVISORY GROUP
PUBLIC HEARING**

Monday, December 6, 2010

6:30p.m.

ATLANTIC CENTER FOR THE ARTS
1414 ART CENTER AVENUE, NEW SMYRNA BEACH, FL 32168-5560

Group Members in Attendance:

Tim Baylie, Lead Managing Agency (Parks, Recreation and Culture)
Randall Sleister, Co-Managing Agency (Land Acquisition and Management)
Jack Hayman, Local Elected Official (County Council)
Barbara Coomber, Private Citizen
Wanda Van Dam, Environmental Group (Sierra Club)
Mary Prevatte, Soil and Water Conservation District

Staff in Attendance:

Joie Alexander, Council Member
Nancy Maddox, Project Manager, Parks, Recreation and Culture Division
Bobbie Bryant, Project Manager, Parks, Recreation and Culture Division
Julie Scofield, Historic Preservation Planner, Parks, Recreation and Culture division
Douglas Weaver, Land Acquisition and Management Division Director
Bill Gardner, Land Acquisition Manager
Ed Isenhour, Volusia Forever Program Coordinator
Stuart Jones, Land Manager
Richard Harris, Environmental Specialist
Jeanette Munson, Staff Assistant
Bill Korn, Environmental Manager, DOF Director's Office
Daniel Young, Zev Cohen & Associates

Private Citizen(s) in Attendance:

Lorelle Friend	Tomm Friend	Penny Lester	William Lester
Tom Simmons	Pat Simmons	Dee Chism	Jake Hickson
Joe Blais	Lisa Blais	Rich Lussky	Ruth Herron
Les Zunk	Russell Kessler	Curtis Burkett	Megan Wilson
Ethan Wilson	Patricia Gahan	Ron Ellis	Paul Eberg
Robert Baker	Robert Moser	Steve Canfield	Jessica DeWall
Michelle LaMoia	John Baehre	Randy Richenberg	Dot Moore
Sonya Guidry	Marissa Moore	Jim Lawrence	Jeff Clunie
Bobby Ball	Shawn Langley	Anna Hogue	

Media Member(s) in Attendance:

Dinah Pulver, Daytona Beach News Journal

Meeting Called to Order

Tim Baylie, Chair, called the meeting to order at 6:32p.m. He introduced himself, the Moderator (Bill Korn) and had each member of the DLSCPMAG introduce themselves to the public present. He

recognized County Council Member Joie Alexander, and a former City Commissioner Randy Richenberg. He requested that the public turn in their written comments and request to speak form, so they could be entered into the record and addressed during the meetings. He then turned the meeting over to Bill Korn, Moderator, who introduced himself, and provided a brief overview of the hearing procedures and process as outlined by the Florida Statutes. He then introduced Daniel Young, representative for Zev Cohen & Associates.

Daniel Young provided a Power Point presentation and explanation of how the “draft” management plan was developed in accordance with the Florida Statute. He explained that the 10 year management plan update includes only those lands, approximately 1,900 acres, within the 2,500+/- acre Doris Leeper Spruce Creek Preserve’s boundaries that are owned by the State of Florida (Board of Trustees). He presented a map depicting the various ownerships within the Preserve to demonstrate which parcels are included in this management plan update. He provided an overview of the eight (8) goals of the management plan, which are:

- 1) restore, improve and maintain natural habitats;
- 2) provide public access, outdoor recreational and educational opportunities;
- 3) protect water quality and quantity, restore hydrology to the extent feasible, and maintain the restored condition;
- 4) manage timber resources for resource conservation and habitat restoration, enhancement, and maintenance;
- 5) remove exotic and invasive plants and animals to the maximum extent practicable and conduct ongoing maintenance, as needed;
- 6) develop, maintain, improve the capital facilities and infrastructure;
- 7) identify, protect, preserve, and maintain cultural resources; and
- 8) maintain, improve, or restore listed and imperiled species populations and habitats.

At the conclusion of the presentation, Bill Korn, asked County staff to introduce themselves and assemble in the front of the room so they could answer questions from the public on the presentation and/or the proposed 10-year management plan update. The floor was opened for public questions and comments.

Question 1: Jim Lawrence asked if they were entertaining questions about the usage of lands owned by the County, or just the ones owned by the State.

Bill Korn responded that the focus is on the State owned lands and not those owned by the County.

Question 2: Tomm Friend requested clarification by asking if the Florida Communities Trust is the “State of Florida.”

Bill Korn explained that the Florida Communities Trust (FCT) is the State’s grant program that receives Florida Forever funds to assist cities and counties with the acquisition of lands for preservation purposes. He added that FCT is not a fee simple owner in these lands and therefore, requires a separate management plan and annual report for these lands as part of the conditions for the grant.

Question 3: Tomm Friend asked if there was a reason why the State lands (i.e., FCT funded) were not included in the proposed management plan update.

Bill Korn stated that the proposed management plan update does include State owned lands.

Daniel Young added and clarified that the fee simple (deeded) ownership was the determining factor as to which parcels were included in this management plan. He explained that FCT was a grants

program that assists with the acquisition of lands, but is not the fee simple (deeded) owner. So, those lands that were acquired with the assistance of FCT funds were not included even though it was "State" funds that were used for its acquisition.

Tomm Friend continued to ask why a certain portion (1,400+/- acres) of the Preserve that received funding from FCT and has the most use by the public were not included in this management plan update.

After clarifying the question, Randall Sleister explained that the parcels purchased with FCT funds were not included as they have separate management plans per FCT's guidelines. He further explained that the Florida Statutes requires the County to develop a management plan for "State" owned lands, not lands that were funded in part by FCT.

Question 4: Ron Ellis asked who owns the tract adjacent to I95 that is identified on the map in pink.

Daniel Young replied that the tract identified on the map in pink (Stanaki) is owned by the City of Port Orange.

Question 5: Ron Ellis asked who is responsible for the management of the Stanaki property.

Randall Sleister explained that the City of Port Orange is currently the manager of the Stanaki property. However, it would transfer to the County when the County becomes a fee simple owner in the property, and the City and County enter into a management agreement. This property would then be included in the overall management of the Preserve.

Question 6: Who oversees the policing (i.e., enforcement of the rules) of these properties.

Bobbie Bryant responded that staff of the County's Parks, Recreation and Culture Division is responsible for policing the properties to ensure all user are adhering to the rules and respecting the resources.

Tim Baylie added that County staff does not have law enforcement powers, so they will try to resolve the matter before calling in a law enforcement official (i.e., Volusia County Sheriff's Office).

Question 7: Dee Chisholm asked where the Atlantic Center for the Arts (ACA) facility was located in relationship to the parcels within the Preserve.

Daniel Young used an aerial map to demonstrate the location of the ACA facility and the parcels within the Preserve.

Question 8: Ron Ellis asked who the City of Port Orange purchased the Stanaki property from.

Randall Sleister stated that the City of Port Orange with FCT funding purchased the Stanaki property from ICI. The County has an agreement with the City of Port Orange to contribute 25% of the purchase using Volusia Forever funds.

Question 9: Bob Baker asked if the Kaye Property was no longer part of the Preserve.

Bill Korn explained that the State only wants to see a map depicting those lands that they own, not those in County ownership. He added that the Kaye Property was purchased with FCT funds, but is

not owned by the State. Therefore, it was not included as part of this management plan update. He again explained that tonight's discussion included only those lands owned by the "State of Florida (Board of Trustees)." If the public has concerns/questions relating to County owned lands that were funded with FCT monies, they need to discuss that with County staff at another time.

Daniel Young pointed out that there is an aerial map depicting the various ownerships within the Preserve, which may provide clarification to the public.

Question 10: Jim Lawrence asked who the public could contact to provide input for the management of those lands that are owned by the County.

Randall Sleister requested that the public submit any comments relating to the management plans for County owned lands to the County's Land Acquisition and Management Division. He explained that public input is not requested for the management plans for these properties due to FCT's short time frame. County staff develops these plans while taking into consideration the management goals and uses of the surrounding properties.

Question 11: Randy Richenberg asked if the MPAG had a representative from the user groups or the historic interest in the community. He added that these groups could provide valuable input with the development of the management plan.

Randall Sleister answered that the MPAG was formed in accordance with the Florida Statutes.

Tomm Friend requested clarification that the MPAG did not include any of the user groups nor anyone involved with the development of the original management plan.

Randall Sleister again responded that the MPAG was formed in accordance with the Florida Statutes and did not include any of the user groups nor anyone involved with the development of the original management plan.

Jim Lawrence asked if there was anything in the Florida Statute limiting additional members of the MPAG.

Bill Korn responded that there wasn't anything in the Florida Statute limiting additional members of the MPAG.

Question 12: Bob Baker noted that the term "harvest" was used throughout the management plan. He asked if the term "harvest" meant harvest for profit or ecological management.

Stuart Jones responded that the term "harvest" meant that the trees would be thinned for the ecological management and restoration of the habitat, not for profit.

Public Comments:

Dot Moore: She applauded County staff for the increased awareness and concern about the historic/archeological resource within the Preserve, and for the land management efforts to preserve these resources.

Sonya Guidry: She supports the land management efforts for the maintenance of the wildlife habitat, especially for the scrub jays, the passive recreational opportunities for people, and the preservation of the historic/archeological resource. However, not all areas should have public access.

Jim Lawrence: He applauded the creation of a site for multi-users and encouraged the use of the trails by all of the multi-user groups. He asked that representative(s) of the various user groups be added to the MPAG, and that the signage at Creekshore be improved. He suggested using markers to identify historic/archeological areas and educating the users so they would know that this is an area to preserve/protect.

Anna May Hogue: Left the meeting before providing any Comments.

Tomm Friend: He stated that the trails plan was created and implemented to form a loop for public protection. He requested that the trails system extend from the east to the west. He suggested using volunteers to help maintain the trails, and conducting prescribed fire in less used areas first before destroying the canopy that provides shade for the users.

Lorelle Friend: She expressed concerns regarding what was included and excluded from the proposed management plan, and the trails system.

Ruth Herron: She recommended reviewing the trails system used by Flatwoods Park and establishing a paved bike loop for road biker.

Robert Baker: He expressed a concerned about the pollution of Turnbull Bay by development, specifically ICI. He likes the management plan, and would like to see additional lands east of I-95 and west of Martin Dairy Trail acquired to protect the hydrology and create a wildlife crossing.

Robert Morgan: He stated that there is a need for the management of all elements, which includes wildlife management through deer hunting.

Bill Korn thanked everyone for participating in the meeting, reviewed the process and informed the public that the next public hearing would be held here on Wednesday, December 8, 2011, at 9:30a.m. Having no further business to discuss, Bill Korn adjourned the meeting at 8:18pm.

**MINUTES
DORIS LEEPER SPRUCE CREEK PRESERVE
MANAGEMENT PLAN ADVISORY GROUP
PUBLIC HEARING**

Wednesday, December 8, 2010

9:30a.m.

ATLANTIC CENTER FOR THE ARTS
1414 ART CENTER AVENUE, NEW SMYRNA BEACH, FL 32168-5560

Group Members in Attendance:

Tim Baylie, Lead Managing Agency (Parks, Recreation and Culture)
Randall Sleister, Co-Managing Agency (Land Acquisition and Management)
Barbara Coomber, Local Property Owner
Jack Hayman, Local Elected Official (County Council)
Wanda Van Dam, Local Conservation Group (Sierra Club)

Absent Group Member(s):

Mary Prevatte, Soil and Water Conservation District

Staff in Attendance:

Joie Alexander, Council Member
Bobbie Bryant, Project Manager, Parks, Recreation and Culture Division
Julie Scofield, Historic Preservation Planner, Parks, Recreation and Culture division
Douglas Weaver, Land Acquisition and Management Division Director
Ed Isenhour, Volusia Forever Program Coordinator
Richard Harris, Environmental Specialist
Jeanette Munson, Staff Assistant
Bill Korn, Environmental Manager, DOF Director's Office
Daniel Young, Zev Cohen & Associates

Private Citizen(s) in Attendance:

Lorelle Friend	Robert Morgan	Cheryl VanDeusen
Dot Moore	Sonya Guidry	Margaret Momberger
Kent Donahue	Shailesh Patel	

Meeting Called to Order

Bill Korn, Moderator, called the meeting to order at 9:32a.m.

Bill Korn, Moderator, briefly summarized Monday night's public meetings, distributed additional written comments, and provided an overview of today's agenda along with the MPAG's role in the process. He also explained the procedures for discussion, making suggestions and coming to consensus during today's meeting. He asked that everyone introduce themselves to each other and to the public present.

Review of Public Comments

The MPAG began reviewing the written comments starting with the ones dated December 6, 2010, from Cheryl VanDeusen of Companion Arabians concerning the following items: 1) mapping changes as it relates to the Kaye Property; 2) no voice for the user groups; 3) width of access points for equestrian users; 4) primitive campsites; 5) hours of operation; 6) no overnight camping; 7) mapping of streams; and 8) definition of "conditional" uses.

Bill Korn opened the discussion by offering the MPAG some guidance when determining what an operational issue is, and what should be part of the management plan.

After discussing these comments with some clarification from Cheryl Van Deusen, the MPAG came to consensus that items 1 thru 6 are operational issues that can be addressed without changes to the management plan. The MPAG also came to consensus that items 7 and 8 required minor changes to the management plan. These changes included: 1) additional language to clarify the description of "Bottomland Forest" on Page 19, Item 9; 2) additional language on Page 45-46, at the bottom of Table F.1 to clarify "approved" and "conditional" uses; 3) change the "use" for silviculture on Page 45, Table F.1 to "conditional;" 4) add "new" to Linear Facilities on Page 45, Table F.1 and change it to "conditional" use; and 5) change "against" within the sentence on Page 45, Table F.1: Summary to "for compliance with."

The next comments included several emails that were routed through Louise Chapman regarding educational issues.

Randall Sleister explained that these comments were related to the Rose Bay tract, but included both State and County owned lands. He and several MPAG members viewed these comments as letters of support, and a desire to continue with the partnership for educating the public.

After reviewing and discussing these comments along with the importance of educating the public, the MPAG came to consensus with adding "and educational" to the last bullet of the Objectives under Section J on Page 58, and descriptive language about the Legacy Program under Section J (Public Access, Recreational and Educational Opportunities).

The next comments were an email from Dorothy Moore regarding the protection/preservation of historic/archaeological areas through regulatory signage.

After reviewing and discussing these comments, the MPAG came to consensus with adding language on Page 57 under Objectives for Section H (Cultural and Historical Resources) relating to the placement of the regulatory signage.

The next comments dated December 6 and 7, 2010, were from Lorelle Friend regarding the land management activities (i.e., roller chopping, prescribed burns) on the Central – Turnbull Tract trails.

After reviewing and discussing these comments with clarification from County staff as to the area of concern and the importance of conducting certain land management activities, the MPAG came to consensus with adding a management prospectus as an appendix. This management prospectus would provide regulatory information from the State. The MPAG also came to consensus that items from the December 7, 2010, comments did not require additional changes to the management plan.

The MPAG moved on to the written comments that were submitted at the December 6, 2010, MPAG meeting.

Randy Richenberg: Wants to make sure that representatives from the user groups would be included in the discussions regarding the future plans of the Preserve, and suggested expanding the MPAG to include the user groups.

Bill Korn noted that these comments were addressed at the December 6, 2010, MPAG meeting, and pertained more toward the County owned lands. The MPAG came to consensus that these issues have already been addressed and moved on to the next comment.

Sonya Guidry: She supports the habitat management for scrub jays, archeological site protection, passive uses (i.e., hiking, bicycling, and horseback riding), and corridor for wildlife.

The MPAG came to consensus that these comments were addressed in the management plan without any changes, and moved on to the next comment.

Joe and Lisa Blais: They would like to see these matters addressed: 1) provide restroom facilities and possible camping; 2) explanation why Martin's Dairy Road gate is open and the east gate is locked after 5:00pm; 3) keeping 4-wheelers off the property; and 4) maintaining the shoreline of borrow pit near I-95.

After discussing these comments separately, the MPAG came to consensus that:

- 1) camping was already addressed in the management plan as a conditional use (primitive camping) on Page 45, Section F (Analysis of Multiple-Use Potential), Table F.1, but additional language would be added to denote that "primitive camping" was allowed with a permit issued by the County;
- 2) additional language would be added on Page 58, Section J (Public Access, Recreational and Educational Opportunities) to define the County's general management practices regarding public access and the hours of operation by tract;
- 3) keeping 4-wheelers (ATVs) off the property is an operational issues that can be addressed without changes to the management plan because this use has already been designated as "rejected" on Page 45 under Section F (Analysis of Multiple-Use Potential), Table F.1; and
- 4) maintaining the shoreline of the borrow pit near I-95 for fishing is an operational issues that can be addressed without changes to the management plan because this use has already been designated as "conditional" on Page 45 under Section F (Analysis of Multiple-Use Potential), Table F.1.

Tim Baylie read additional emailed comments from Joe Blais regarding the 1) management of the wildlife through hunting (deer and feral hog); 2) need for additional trail signage; 3) need to maintain the canopy provided by the oak trees; 4) continued maintenance of the trails as a non-paved system; and 5) prevention of unauthorized uses (i.e., ATVs) on the property.

Bill Korn then read the written comments provided by Robert Morgan at the December 6, 2010, MPAG meeting also relating to the management of the wildlife through hunting.

After discussing these comments, the MPAG came to consensus with:

- 1) adding language on Page 51 under Section E (Exotic and Invasive Species Maintenance and Control) and Page 29 under Section C (Fish and Wildlife) to demonstrate, at this time, that the feral hog's population levels and their impact to the natural resource have been observed;
- 2) leaving "hunting" as a "rejected" use, but add additional language explaining that the County would consult with FWC regarding any potential need for hunting;
- 3) addressing the request for additional signage and canopy maintenance matters as operational issues that could be addressed without changes to the management plan;
- 4) leaving the trails system as non-paved trails and not making any changes to the management plan; and
- 5) adding additional language under regulatory signage to address unauthorized access issues.

The MPAG moved on to the summary of comments provided by the public on December 6, 2010.

Dot Moore: She applauded County staff for the increased awareness and concern about the historic/ archeological resource within the Preserve, and for the land management efforts to reserve these resources.

The MPAG came to consensus that these comments were in support of the management plan without any changes, and moved on to the next comment.

Sonya Guidry: She supports the land management efforts for the maintenance of the wildlife habitat, especially for the scrub jays, the passive recreational opportunities for people, and the preservation of the historic/ archeological resource. However, not all areas should have public access.

The MPAG came to consensus that these comments were in support of the management plan without any changes, and moved on to the next comment.

Jim Lawrence: He applauded the creation of a site for multi-users and encouraged the use of the trails by all of the multi-user groups. He asked that representative(s) of the various user groups be added to the MPAG, and that the signage at Creekshore be improved. He suggested using markers to identify historic/ archeological areas and educating the users so they would know that this is an area to preserve/ protect.

The MPAG came to consensus that these comments had previously been discussed and addressed, and no additional changes to the management plan were needed. They moved on to the next comment.

Anna May Hogue: Left the meeting before providing any comments.

Tomm Friend: He stated that the trails plan was created and implemented to form a loop for public protection. He requested that the trails system extend from the east to the west. He suggested using volunteers to help maintain the trails, and conducting prescribed fire in less used areas first before destroying the canopy that provides shade for the users.

After discussing these comments with some clarification from County staff, the MPAG came to consensus with:

- 1) adding additional language on Page 58 under Section J (Public Access, Recreational and Educational Opportunities) to reference a Recreational Plan, which would provide clarification about the goals and objectives for the management of the trails and the various recreational opportunities to minimize the impacts to the natural resources within the Preserve;
- 2) adding an additional item (Current Use and Development) on Page 42 under Section III, Usage of the Property, with an inventory of recreational and access facilities by tract;
- 3) adding additional language on Page 45 under Section F (Analysis of Multiple-Use Potential) referencing the Recreational Plan, which discusses the implementation of the uses, and provides for guidance of public use management in the context of the two prong approach to natural resource protection and public access; and
- 4) adding language to the "objectives" on Page 58 under Section J (Public Access, Recreational and Educational Opportunities) for coordination with local jurisdictions/cities.

The MPAG came to consensus that the comments from Lorelle Friend had previously been addressed and moved on to the next comments.

Robert Baker: He expressed concerns about the pollution of Turnbull Bay by development, specifically ICI. He likes the management plan, and would like to see additional lands east of I-95 and west of Martin's Dairy Trail acquired to protect the hydrology and create a wildlife crossing.

After discussing these comments with some clarification from County staff, the MPAG came to consensus with:

- 1) adding additional language on Page 7 under Section C (Optimal Boundary) to explain the FDEP's process and reasons for changing the optimal boundaries; and
- 2) adding an additional "Strategy" on Page 63 under Section D (Development Encroachment) for entering into an agreement with concurrence from another jurisdiction as it relates to management and encroachment adjacent to the Preserve and land use changes.

After completing their review of the public's comments, the MPAG moved on to address comments from each MPAG member.

MPAG Comments

Jack Hayman expressed a concern regarding the unknown impacts to the management plan from the federal and state regulations that are being handed down to the local levels. He referenced several sections relating to water resources that could be impacted by these regulations.

Randall Sleister provided several editorial and grammatical changes, including: 1) acreage changes on the Executive Summary; 2) additional descriptive language on Page 15 under Section B (Natural Communities) with a table listing the various communities, acreage, area percentage, and fire intervals/returns; 2) insertion of a table summarizing the goals and objectives for the Preserve on Page 59 under the Objectives of Section K (Conservation Acquisition and Stewardship Partnerships); and 3) additional language on Page 61 under Section C (Prescribed Fire), Strategy.

Wanda Van Dam requested additional language on Page 1 under General Information to provide clarification as to which lands are involved in this management plan and why the entire Preserve is not; and on Page 7 under Optimal Boundary to provide emphasis in the acquisition of lands with the optimal boundaries. She expressed a concern that public pressures could hinder the implementation of certain aspects of the management plan, but felt that the proposed management plan provided a balance between the need for public access and preservation/restoration of the natural resources.

Tim Baylie suggested adding additional goals and objectives beginning on Page 47 under Section IV (Management Goals and Objectives) that are measurable and obtainable. He requested that Appendix C-3 be replaced with Appendix C-7.

Barbara Coomber provided an editorial change on Page 64 under Section VIII (Land Management Review); correction of the Appendix number from P to I. She also felt that the proposed management plan provides a balance between public access and preservation/restoration of the natural resources.

After discussing each MPAG member's comments, the MPAG came to consensus with these recommended changes.

Bill Korn explained the next steps in the process, which would include revising the plan, obtaining approval from County Council, and final approval from ARC. He suggested publishing the "revised" management plan on-line for the purposes of transparency throughout this process. He also provided a brief overview of ARC's review and approval processes.

Adjournment -

Having no further business, the meeting adjourned at 2:30p.m upon unanimous consent of the MPAG.

APPENDIX E:
FNAI Letter Report



1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
850-224-8207
fax 850-681-9364
www.fnai.org

February 1, 2011

Randall Sleister
Volusia County Land Acquisition and Management Division
123 W. Indiana Avenue
Deland, FL 32720

Re: Doris Leeper Spruce Creek Preserve, Volusia County

Dear Mr. Sleister,

Thank you for your request for information on Doris Leeper Spruce Creek Preserve (hereafter the Preserve) from the Florida Natural Areas Inventory (FNAI). We have compiled the following information for the property.

This site is located within a significant region of natural areas and habitat for several rare species, and is within a significant area of scrub habitat, a natural community in decline that provides important habitat for several rare species. Special consideration should be taken to avoid and/or mitigate impacts to these natural resources and to design land uses that are compatible with these resources.

Documented Element Occurrences

Attached is a Managed Area Summary for this site, which lists the rare species we have documented within the boundaries of the Preserve.

We also include a map of all Element Occurrences on and in the vicinity of the preserve (see enclosed map and Element Occurrence table). Please be advised that a lack of Element Occurrences in the FNAI database is not a sufficient indication of the absence of rare or endangered species on a site.

The map also depicts observation points from a Florida scrub-jay survey that was conducted for the U.S. Fish and Wildlife Service by staff and associates of the Archbold Biological Station from 1992 to 1996 (Pranty and Stith, 1994).

The Element Occurrences data layer includes occurrences of rare species and natural communities. The map legend indicates that some Element Occurrences occur in the general vicinity of the label point. This may be due to lack of precision of the source data, or an element that occurs over an extended area (such as a wide ranging species or large natural community). For animals and plants, Element Occurrences generally refer to more than a casual sighting; they usually indicate a viable population of the species. Note that some Element Occurrences represent historically documented observations which may no longer be extant. Extirpated Element Occurrences will be marked with an 'X' following the occurrence label on the enclosed map.

Citation: Fitzpatrick, J.W., B. Pranty, and B. Stith. 1994. Florida scrub jay statewide map, 1992-1993. U. S. Fish and Wildlife Service Report, Cooperative Agreement no. 14-16-004-91-950.



Florida Resources
and Environmental
Analysis Center

Institute of Science
and Public Affairs

The Florida State University

Likely and Potential Rare Species

In addition to documented occurrences, we estimate there is over 600 acres of potential habitat for the federally threatened Florida scrub-jay (*Aphelocoma coerulescens*) on the Preserve. This estimate is based on FNAI statewide habitat models and a 2004 survey we conducted for Volusia County (NeSmith, et al. 2004). The recent land acquisition that is now included in the western portion of the Preserve supports a significant amount of good quality scrubby flatwoods, in addition to the 600 acres of scrub habitat identified in 2004. The preserve also supports about 600 acres of potential habitat buffer for the federally endangered manatee (*Trichechus manatus*); these acres are along the shores of Spruce Creek, Strickland Bay, Rose Bay, and Turnbull Bay.

FNAI habitat models indicate areas, which based on land cover type, offer suitable habitat for one or more rare species that is known to occur in the vicinity. Habitat models have been developed for approximately 300 of the rarest species tracked by the Inventory, including all federally listed species.

K. NeSmith, S. Jue, and G. Schultz. 2004. Survey for Florida Scrub-Jays and Inventory of Scrub Habitat in Volusia County. Report to Volusia County. Florida Natural Areas Inventory, Tallahassee, FL

Land Acquisition Projects

This site is within the Spruce Creek Florida Forever BOT Project, which is part of the State of Florida's Conservation and Recreation Lands land acquisition program. A description of this project is enclosed. For more information on this Florida Forever Project, contact the Florida Department of Environmental Protection, Division of State Lands.

Florida Forever Board of Trustees (BOT) projects are proposed and acquired through the Florida Department of Environmental Protection, Division of State Lands. The state has no specific land management authority over these lands until they are purchased.

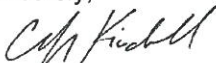
We always recommends that professionals familiar with Florida's flora and fauna should conduct a site-specific survey to determine the current presence or absence of rare, threatened, or endangered species. Please visit www.fnai.org/trackinglist.cfm for county or statewide Element Occurrence distributions and links to more element information.

The database maintained by FNAI is the single most comprehensive source of information available on the locations of rare species and other significant ecological resources. However, the data are not always based on comprehensive or site-specific field surveys. Therefore, this information should not be regarded as a final statement on the biological resources of the site being considered, nor should it be substituted for on-site surveys. Inventory data are designed for the purposes of conservation planning and scientific research, and are not intended for use as the primary criteria for regulatory decisions.

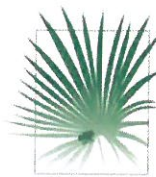
The information provided may not be published without prior written notification to the Florida Natural Areas Inventory, and the Inventory must be credited as an information source in these publications. You may include these materials in the upcoming Preserve management plan update. FNAI data may not be resold for profit.

This report is made available at no charge as a public service of the Florida Department of Environmental Protection and FNAI. Thank you for your request for FNAI information. If I can be of further assistance, please don't hesitate to give me a call at (850) 224-8207 or email me at ckindell@fnai.org.

Sincerely,



Carolyn Kindell
Managed Areas Biologist
Encl



1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
(850) 224-8207
(850) 681-9364 Fax

FLORIDA
Natural Areas
INVENTORY

Florida Natural Areas Inventory

Managed Area Element Summary Doris Leeper Spruce Creek Preserve



SCIENTIFIC NAME	COMMON NAME	Global rank	State rank	Federal status	State status
Plants and Lichens					
<i>Nolina atopocarpa</i>	Florida Beargrass	G3	S3	N	LT
Reptiles					
<i>Gopherus polyphemus</i>	Gopher Tortoise	G3	S3	N	ST
Birds					
<i>Haliaeetus leucocephalus</i>	Bald Eagle	G5	S3	N	N



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FLORIDA
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Florida Natural Areas Inventory

Managed Area Element Summary Doris Leeper Spruce Creek Preserve



SCIENTIFIC NAME

COMMON NAME

Global
rank

State
rank

Federal
status

State
status

Using a ranking system developed by NatureServe and the Natural Heritage Program Network, the Florida Natural Areas Inventory assigns two ranks for each element. The global rank is based on an element's worldwide status; the state rank is based on the status of the element in Florida. Element ranks are based on many factors, the most important ones being estimated number of Element Occurrences (EOs), estimated abundance (number of individuals for species; area for natural communities), geographic range, estimated number of adequately protected EOs, relative threat of destruction, and ecological fragility.

FNAI GLOBAL ELEMENT RANK

- G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
- G2 = Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
- G3 = Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.
- G4 = Apparently secure globally (may be rare in parts of range).
- G5 = Demonstrably secure globally.
- GH = Of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker).
- GX = Believed to be extinct throughout range.
- GXC = Extirpated from the wild but still known from captivity or cultivation.
- G#? = Tentative rank (e.g., G2?).
- G#G# = Range of rank; insufficient data to assign specific global rank (e.g., G2G3).
- G#T# = Rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definition as above (e.g., G3T1).
- G#Q = Rank of questionable species - ranked as species but questionable whether it is species or subspecies; numbers have same definition as above (e.g., G2Q).
- G#T#Q = Same as above, but validity as subspecies or variety is questioned.
- GU = Unrankable; due to a lack of information no rank or range can be assigned (e.g., GUT2).
- GNA = Ranking is not applicable because the element is not a suitable target for conservation (e.g. a hybrid species).
- GNR = Element not yet ranked (temporary).
- GNRTNR = Neither the element nor the taxonomic subgroup has yet been ranked.

FNAI STATE ELEMENT RANK

- S1 = Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
- S2 = Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
- S3 = Either very rare and local in Florida (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.
- S4 = Apparently secure in Florida (may be rare in parts of range).
- S5 = Demonstrably secure in Florida.
- SH = Of historical occurrence in Florida, possibly extirpated, but may be rediscovered (e.g., ivory-billed woodpecker).
- SX = Believed to be extirpated throughout Florida.
- SU = Unrankable; due to a lack of information no rank or range can be assigned.
- SNA = State ranking is not applicable because the element is not a suitable target for conservation (e.g. a hybrid species).
- SNR = Element not yet ranked (temporary).

FEDERAL LEGAL STATUS

Florida Natural Areas Inventory

Managed Area Element Summary

Doris Leeper Spruce Creek Preserve



Legal status information provided by FNAI for information only. For official definitions and lists of protected species, consult the relevant federal agency.

Definitions derived from U.S. Endangered Species Act of 1973, Sec. 3. Note that the federal status given by FNAI refers only to Florida populations and that federal status may differ elsewhere.

C = Candidate species for which federal listing agencies have sufficient information on biological vulnerability and threats to support proposing to list the species as Endangered or Threatened.

LE = Endangered: species in danger of extinction throughout all or a significant portion of its range.

LE, LT = Species currently listed endangered in a portion of its range but only listed as threatened in other areas

LE, PDL = Species currently listed endangered but has been proposed for delisting.

LE, PT = Species currently listed endangered but has been proposed for listing as threatened.

LE, XN = Species currently listed endangered but tracked population is a non-essential experimental population.

LT = Threatened: species likely to become Endangered within the foreseeable future throughout all or a significant portion of its range.

SAT = Treated as threatened due to similarity of appearance to a species which is federally listed such that enforcement personnel have difficulty in attempting to differentiate between the listed and unlisted species.

SC = Not currently listed, but considered a "species of concern" to USFWS.

STATE LEGAL STATUS

Provided by FNAI for information only. For official definitions and lists of protected species, consult the relevant state agency.

Animals: Definitions derived from "Florida's Endangered Species and Species of Special Concern, Official Lists" published by Florida Fish and Wildlife Conservation Commission, 1 August 1997, and subsequent updates.

FE = Listed as Endangered Species at the Federal level by the U. S. Fish and Wildlife Service

FT = Listed as Threatened Species at the Federal level by the U. S. Fish and Wildlife Service

F(XN) = Federal listed as an experimental population in Florida

FT(SA) = Federal Threatened due to similarity of appearance

ST = State population listed as Threatened by the FFWCC. Defined as a species, subspecies, or isolated population which is acutely vulnerable to environmental alteration, declining in number at a rapid rate, or whose range or habitat is decreasing in area at a rapid rate and as a consequence is destined or very likely to become an endangered species within the foreseeable future. (ST* for *Ursus americanus floridanus* (Florida black bear) indicates that this status does not apply in Baker and Columbia counties and in the Apalachicola National Forest. ST* for *Neovison vison* pop.1 (Southern mink, South Florida population) indicates that this status applies to the Everglades population only.)

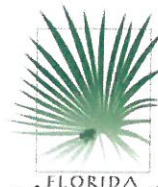
SSC = Listed as Species of Special Concern by the FFWCC. Defined as a population which warrants special protection, recognition, or consideration because it has an inherent significant vulnerability to habitat modification, environmental alteration, human disturbance, or substantial human exploitation which, in the foreseeable future, may result in its becoming a threatened species.

(SSC* indicates that a species has SSC status only in selected portions of its range in Florida. SSC* for *Pandion haliaetus* (Osprey) indicates that this status applies in Monroe county only.)

N = Not currently listed, nor currently being considered for listing.

Plants: Definitions derived from Sections 581.011 and 581.185(2), Florida Statutes, and the Preservation of Native Flora of Florida Act, 5B-40.001. FNAI does not track all state-regulated plant species; for a complete list of state-regulated plant species, call Florida Division of Plant Industry, 352-372-3505 or see: <http://www.doacs.state.fl.us/pi/>.

LE = Endangered: species of plants native to Florida that are in imminent danger of extinction within the state, the survival of which



FLORIDA
Natural Areas
INVENTORY

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Florida Natural Areas Inventory

Managed Area Element Summary

Doris Leeper Spruce Creek Preserve



is unlikely if the causes of a decline in the number of plants continue; includes all species determined to be endangered or threatened pursuant to the U.S. Endangered Species Act.

LT = Threatened: species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in number as to cause them to be Endangered.

N = Not currently listed, nor currently being considered for listing.



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Element Occurrences

- Animals
- Plants
- Communities
- Other
- Data Sensitive

Point Indicates General
Vicinity of Element



U.S. Fish & Wildlife Service
Scrub Jay Survey 1992-96

Conservation Lands

- Federal
- State
- Local
- Private
- State Aquatic Preserves

Land Acquisition Projects

Florida Forever
Board of Trustees Projects

- FNAI Rare Species
Habitat
- FNAI Biodiversity Matrix
Square Mile Units

County Boundary

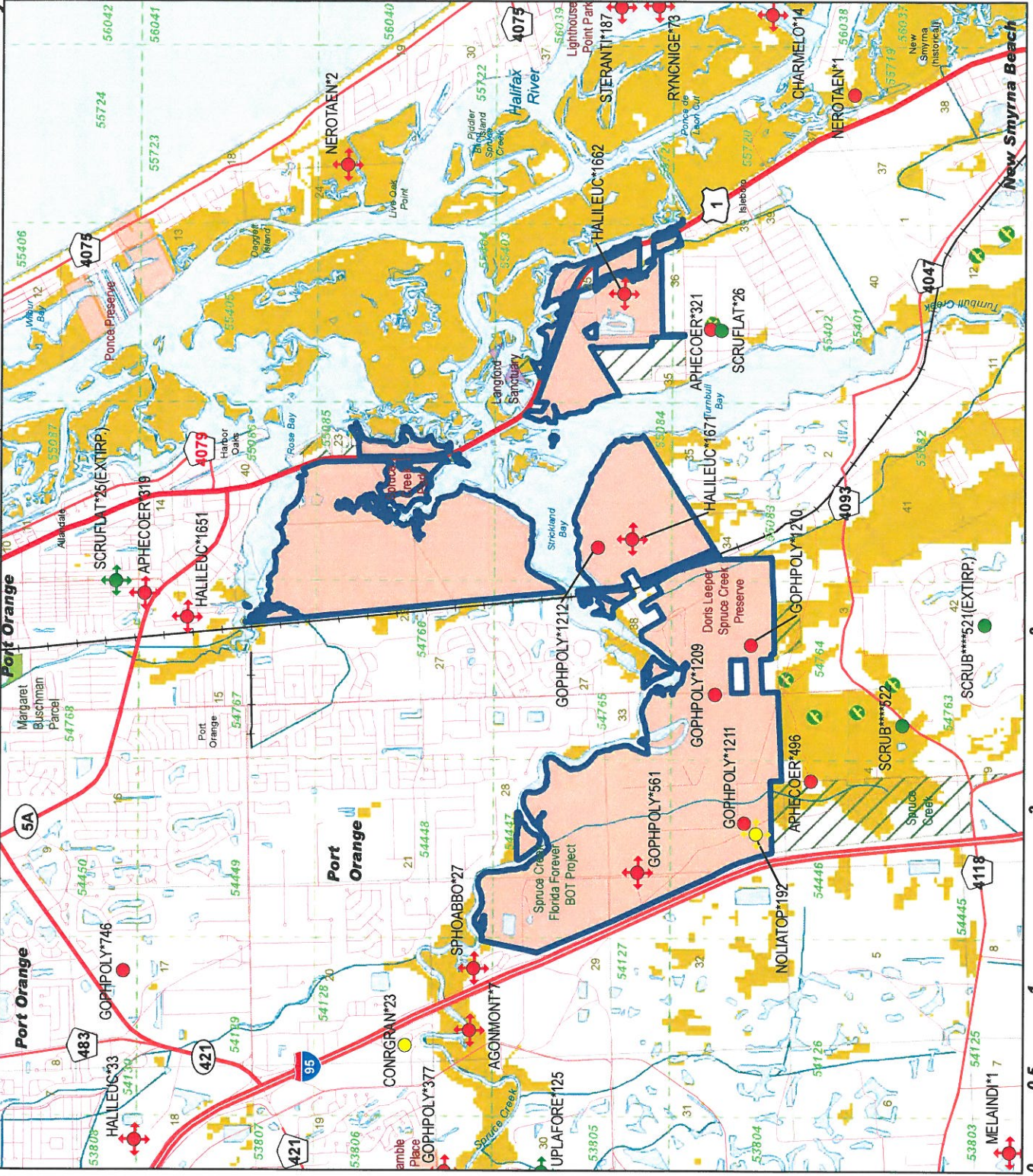
- Interstate
- Turnpike
- Major Highway
- Local Road
- Railroad [inactive railroads
shown in Gray]
- Water

NOTE
Map should not be interpreted without
accompanying documents.

Doris Leeper Spruce Creek Preserve

Volusia County

Site boundaries are approximate.



Map produced by MGO
Map Date: 25 Jan 2011



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Florida Natural Areas Inventory

ELEMENT OCCURRENCES DOCUMENTED ON OR NEAR Doris Leeper Spruce Creek Preserve



Map Label	Scientific Name	Common Name	Global State Rank	Federal Rank	Status	Listing	Observation Date	Description	EO Comments
AGNOMONT*7	<i>Agonostomus monticola</i>	Mountain Mullet	G5	S3	N	N	1951-11-08	No general description given	2 SPECIMENS COLLECTED ON 29 APR. 1950 (UF-007790) AND 1 SPECIMEN COLLECTED ON 11 AUG. 1951 (UF-007791).
APHECOER*319	<i>Aphelocoma coerulescens</i>	Florida Scrub-jay	G2	S2	LT	FT	1981-05-17	"OPEN SLASH PINE SCRUB, SOME HAS BEEN DEVELOPED" SCRUBBY FLATWOODS	1981-05-17 2 SCRUB JAYS.
APHECOER*321	<i>Aphelocoma coerulescens</i>	Florida Scrub-jay	G2	S2	LT	FT	1981-05-17	"DISTURBED SLASH PINE SCRUB, DEVELOPMENT TO SOUTH" SCRUBBY FLATWOODS	1981-05-17 2 SCRUB JAYS.
APHECOER*496	<i>Aphelocoma coerulescens</i>	Florida Scrub-jay	G2	S2	LT	FT	2005-02-10	2005-02-10: Rural residential with immature sand pine scrub to west and farm to east on road (PNDLYO02FLUS).	2005-02-10: Five, maybe 6, birds observed; none banded. Birds using both sides of road (PNDLYO02FLUS). 2003: found the area where jays were found in 1993 to be unsuitable, dense, 20-30' planted sand pines (PNDNES03FLUS). 1993-05-17: Six jays in 3 group
CHARMELO*14	<i>Charadrius melodus</i>	Piping Plover	G3	S2	LT	FT	1987-02-24	MARINE UNCONSOLIDATED SUBSTRATE (SAND SHOAL).	WINTERING AREA: 1986 - 10 OBSERVED AT INLET IN JAN. (U86JOH01FL), 1987 - 2 OBSERVED IN FEB. FORAGING WITH MULTI-SPECIES FLOCK ON SAND SHOAL IN BASS FLATS (U87NIC04FL).
CONRGRAN*23	<i>Conradina grandiflora</i>	Large-flowered Rosemary	G3	S3	N	LT	1987-10-26	SAND PINE SCRUB ON TRUCK PARKING SIDE OF REST AREA	10-40 PLANTS IN FULL FLOWER ON DISTURBED BANK (ALSO CONTINUING INTO THE UNDISTURBED SCRUB).
GOPHPOLY*1209	<i>Gopherus polyphemus</i>	Gopher Tortoise	G3	S3	N	ST	2003-08-28	2003-08-28: in powerline row in overgrown sand pine/oak scrub (U04SCH04FLUS).	2003-08-28: five burrows and 1 juvenile (approximately 5 inches in length) observed. Sizes of burrows: 3 juvenile, 2 adult (U04SCH04FLUS).
GOPHPOLY*1210	<i>Gopherus polyphemus</i>	Gopher Tortoise	G3	S3	N	ST	2003-08-28	2003-08-28: in xeric hammock, historically scrub (U04SCH04FLUS).	2003-08-28: two burrows approximately 70 meters apart. At northernmost burrow, 1 adult female observed (U04SCH04FLUS).
GOPHPOLY*1211	<i>Gopherus polyphemus</i>	Gopher Tortoise	G3	S3	N	ST	2004-07-06	2004-07-06: along ORV trail/sand road in overgrown scrub (U04SCH04FLUS).	2004-07-06: three active burrows at two locations along a 0.1 mile stretch of sand road, at least one of them is adult (12" at burrow opening) (U04SCH04FLUS).



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Map Label	Scientific Name	Common Name	Global State Rank	Federal Status	State Listing	Observation Date	Description	EO Comments
GOPHPOLY*1212	<i>Gopherus polyphemus</i>	Gopher Tortoise	G3	S3	N	ST	2004-05-19	2004-05-19: scrubby flatwoods (U04SCH04FLUS)
GOPHPOLY*377	<i>Gopherus polyphemus</i>	Gopher Tortoise	G3	S3	N	ST	1983-02-18	Sandhills and scrubby flatwoods variants; very old growth longleaf pine forest (understory mowed but not burned); sand pine-turkey oak and saw palmetto understories; <i>Aristida stricta</i> present.
GOPHPOLY*561	<i>Gopherus polyphemus</i>	Gopher Tortoise	G3	S3	N	ST	1989-10-24	2007-02-07: 3 active burrows were discovered poached (dug up) in the northernmost clearing. Manager stated they had been active (PNDKIN02FLUS, PNDKIN01FLUS). 1989-10-24: 3 active burrows, 1 individual (U90MAC05FLUS).
GOPHPOLY*746	<i>Gopherus polyphemus</i>	Gopher Tortoise	G3	S3	N	ST	1991-07-03	SCRUB-SANDPINE; PRIMARILY OAKS AND PINES WITH SCATTERED PALMETTO AND ROSEMARY UNDERSTORY. SANDY SOIL.
HALILEUC*1651	<i>Haliaeetus leucocephalus</i>	Bald Eagle	G5	S3	N	N	2003	Nest status: Active, 2003, 2002, 2001, 2000, 1999;(U03FWC01FLUS)
HALILEUC*1662	<i>Haliaeetus leucocephalus</i>	Bald Eagle	G5	S3	N	N	2003	Nest status: Active, 2003, 2002, 2001; Unknown status or not assessed, 2000, 1999;(U03FWC01FLUS)
HALILEUC*1671	<i>Haliaeetus leucocephalus</i>	Bald Eagle	G5	S3	N	N	2006	2006: continuously active 2003 - 2006 (W06FWC01FLUS). 2003: Nest status: Active, 2003, 2002; Unknown status or not assessed, 2001, 2000, 1999;(U03FWC01FLUS)
HALILEUC*33	<i>Haliaeetus leucocephalus</i>	Bald Eagle	G5	S3	N	N	1983	Nest status 1999-2003: Inactive - 2003; Unknown/not assessed - 2002, 2001, 2000, 1999; Status 1995-98: Inactive - 1998, 1997, 1996, 1995; (U03FWC01FLUS). Previous data (note different format) NEST; 1995-93: GONE; 1992-89: NO DATA; 1988-86: GONE; 1985: US
MELAINDI*1	<i>Melanoplus indicifer</i>	East Coast Scrub Grasshopper	G1G2	S1S2	N ^E	10 ^N	1938-08-31	1938-08-31: No description given (U08ALM01FLUS).



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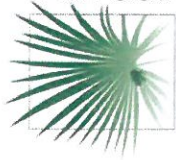
Florida Natural Areas Inventory

ELEMENT OCCURRENCES DOCUMENTED ON OR NEAR Doris Leeper Spruce Creek Preserve



INVENTORY

Map Label	Scientific Name	Common Name	Global State Rank	Federal Status	State Listing	Observation Date	Description	EO Comments	
NEROTAEN*1	<i>Nerodia clarkii taeniata</i>	Atlantic Salt Marsh Snake	G4T1Q	S1	LT	FT	1987-05-20	No general description given	ONE DOR JUVENILE ON ROAD; ONE ADULT FEMALE COLLECTED IN MARSH. THE FEMALE GAVE BIRTH TO 3 YOUNG ON 15 OCT. 1987.
NEROTAEN*2	<i>Nerodia clarkii taeniata</i>	Atlantic Salt Marsh Snake	G4T1Q	S1	LT	FT	1979-10-04	No general description given	SNAKE(S) OBSERVED BY MOLER AND KOCHMAN.
NOLIATOP*192	<i>Nolina atopocarpa</i>	Florida Beargrass	G3	S3	N	LT	2004-07-06	2004-07-06: scrubby flatwoods, moderately fire-excluded, with some ORV trails (U04SCH04FLUS)	2004-07-06: 100-1000 plants scattered in a wide area, most in flower, few in fruit. Plants in clusters, to 3' tall (U04SCH04FLUS).
RYNCNIGE*73	<i>Rhynchops niger</i>	Black Skimmer	G5	S3	N	SSC	1990-05-24	Beach dune	1990/05/24: J.A. Hovis, GFC, observed 9 adults. No evidence of breeding activity.
SCRUB***521	Scrub		G2	S2	N	N	1984-01-28	SCRUB SITE IS RELATIVELY LEVEL. LARGE AND NUMEROUS SERENOA REPENS. DOMINANT SHRUBS ARE CHAPMAN, MYRTLE AND LIVE OAK (U88CHR01). F84STO09 REPORTS ARISTIDA STRICTA IN OCCASIONAL OPENINGS, BUT GENERALLY, THERE IS LITTLE GROUND VEGETATION.	SOME TREES ARE 40 CM D6H.
SCRUB***522	Scrub		G2	S2	N	N	2004	SAND PINE SCRUB LOCATED ON OLD DUNE LINE. SHRUB LAYER DENSITY AND HEIGHT VARIES FROM E TO W ACROSS DUNE. UNDERSTORY DOMINATED BY OAKS, LYONIA FERRUGINEA, XIMENIA AND SERENOA REPENS.	2004: Update to last obs date was based on interpretation of aerial photography (previous value was 1984-01-28) (U05FNA02FLUS). AN OLD STAND OF SAND PINE ON SITE. NUMEROUS SAND PINE SEEDLINGS PRESENT.
SCRUFAT*25	Scrubby flatwoods		G2	S2?	N	N	1981-05-17	"OPEN SLASH PINE SCRUB, SOME HAS BEEN DEVELOPED" SCRUBBY FLATWOODS	No EO data given
SCRUFAT*26	Scrubby flatwoods		G2	S2?	N	N	2004	"DISTURBED SLASH PINE SCRUB, DEVELOPMENT TO SOUTH" SCRUBBY FLATWOODS	2004: Update to last obs date was based on interpretation of aerial photography (previous value was 1981-05-17) (U05FNA02FLUS).



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Florida Natural Areas Inventory

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Map Label	Scientific Name	Common Name	Global State			Observation Date	Description	EO Comments
			Rank	Status	Federal Listing			
SPHOABBO*27	<i>Sphodros abbotti</i>	Blue Purse-web Spider	G4G5	N	N	1998-05-19	1998-05-19: webs found at the bases of trees (U98MOL02FLUS).	1998-05-19: Species was collected on site by P.E. Moler (U98MOL02FLUS).
STERANTI*187	<i>Sternula antillarum</i>	Least Tern	G4	N	ST	1988	No general description given	1991/07/05: J.A. Hovis, GFC, no terns or nests observed (U97GFC02FLUS). 1990/05/24: J.A. Hovis, GFC, no nesting activity observed (U97GFC02FLUS). 1988: nesting began on 24 May and ended on 26 July; 40 nests observed (U97GFC02FLUS). 1987/05/08: T.E. O'Meara
UPLAFORE*125	Upland hardwood forest		G5	N	N	2004	TRANSITION FROM SCRUB UPLANDS TO CYPRESS/RED MAPLE FLOODPLAIN. WATER SEEPS FROM BASE OF SLOPE AT SEVERAL POINTS	2010: Prior to the 2010 natural community reclassification effort this EO had been known as Slope forest EO number 1 (see U10FNA01FLUS for updated community descriptions). 2004: Update to last obs date was based on interpretation of aerial photography (p

Spruce Creek

Volusia County

Substantially Complete

Purpose for State Acquisition

Natural areas along the coast of Volusia County are becoming scarce as residential developments expand from Daytona Beach and New Smyrna Beach. The Spruce Creek project protects one of the largest tracts of undeveloped land left in this region along the estuary of Spruce Creek and helps to maintain the water quality of the creeks and bays here, thus protecting a fishery. Additionally, this project will conserve what may be the site of Andrew Turnbull's 18th-century plantation and provide a recreational area where people can do anything from hiking and fishing to simply learning about the plants and animals of this scenic landscape.

Manager

Volusia County.

General Description

The original Spruce Creek project area, north and west of Strickland Bay, contains good estuarine tidal swamps, hammocks, scrub, and flatwoods. It protects habitat for such endangered or threatened species as bald eagles, wood storks and manatees. The addition, between U.S. 1 and Turnbull Bay, contains good Maritime or Xeric Hammock, with live oaks, cabbage palms, and several tropical shrubs near their northern limits. Flatwoods also cover a large part of the addition, and tidal marsh with remnants of black mangrove fringes it. Disturbed areas include an historic house at the north end and the remains of a fish camp and marina east of U.S. 1. No FNAI-listed plants are known from the addition; of FNAI-listed animals, gopher tortoises have been found. The area is adjacent to several Outstanding

Florida Waters, and the aquatic resources are important to both recreational and commercial fisheries. There are two archaeological sites recorded within the project area: Spruce Creek Mound site, a prehistoric and historic burial mound; and J. D. site, a prehistoric and historic shell midden and burial site. The project may also contain historic archaeological sites related to the British Colonial Period occupation in this area of NE Florida (ca. 1763–1783 AD). The area is experiencing significant growth, so developable acreage is likely to be lost relatively soon.

Public Use

This project is designated as a recreation area with uses such as cultural and environmental education, hiking, fishing, camping and picnicking.

Acquisition Planning

On December 1, 1989, the Land Acquisition Advisory Council (LAAC) added the original Spruce Creek project to the CARL Priority list. This fee-simple acquisition, sponsored by Volusia County, consisted of approximately 1,718 acres, nine owners, and a 1989 taxable value of \$2,675,000. On December 7, 1990, an owner sponsored 54-acre parcel was added to the boundary. The project was removed on December 10, 1992 due to unwilling sellers. At that time, it was less than 90% complete.

On December 6, 1994, LAAC added the current Spruce Creek project to the 1995 CARL Priority list. This

Placed on List 1990*

Project Area (Acres) 2,831

Acres Acquired 2,289**

at a Cost of \$19,118,050**

Acres Remaining 542

with Estimated (Tax Assessed) Value of \$10,068,445

* Combined with Spruce Creek Addition in 1994

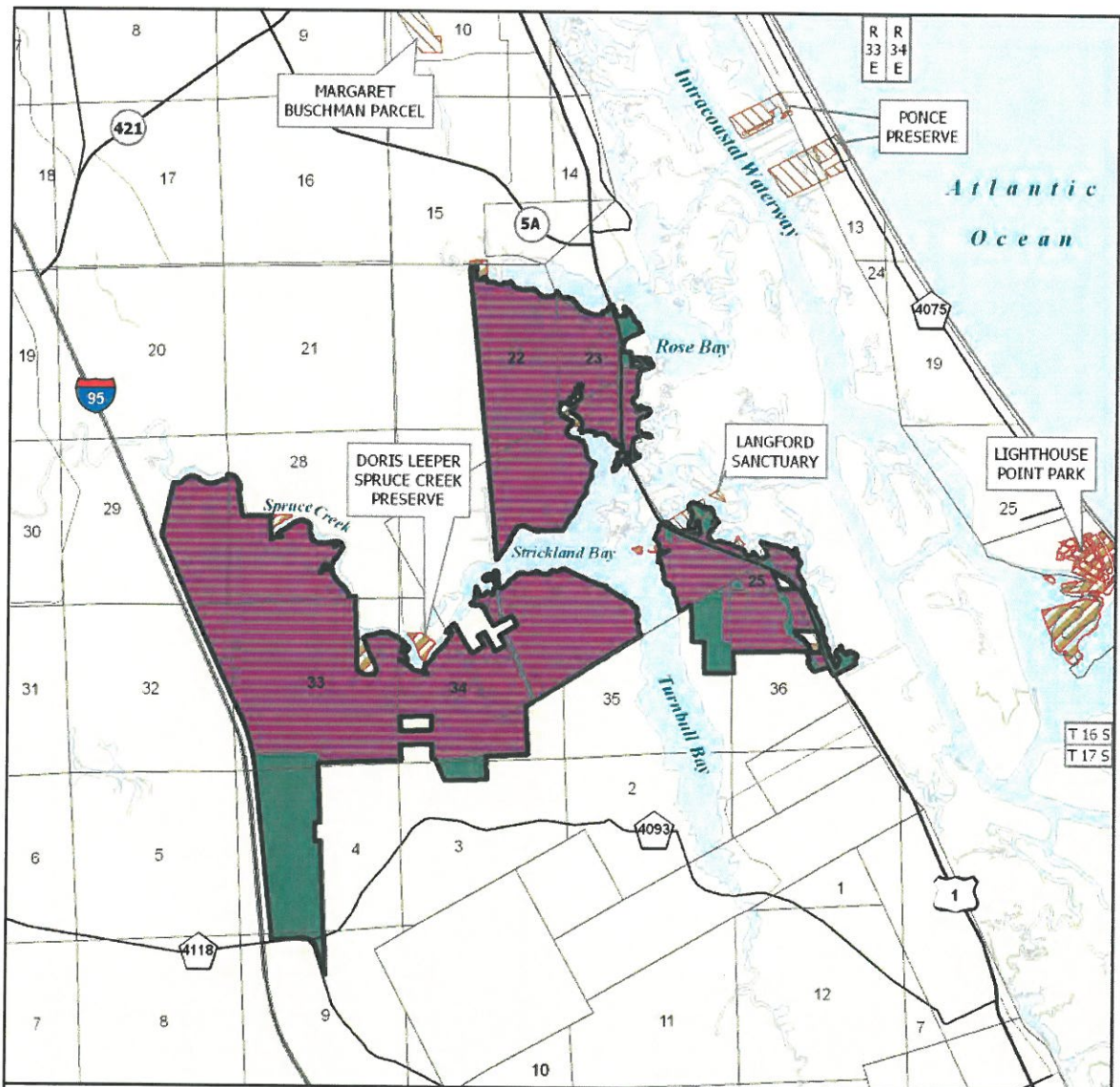
**includes funds spent and acreage acquired by BOT, SJRWMD, Volusia County, and the City of Port Orange.

Note: 97 acres removed 10/2009 due to residential/commercial/infrastructure development.

Spruce Creek FNAI Elements	
Florida Scrub-jay	G2/S2
Gopher Tortoise	G3/S3
Florida Beargrass	G3/S3
Bald Eagle	G5/S3
4 rare species are associated with the project	

E

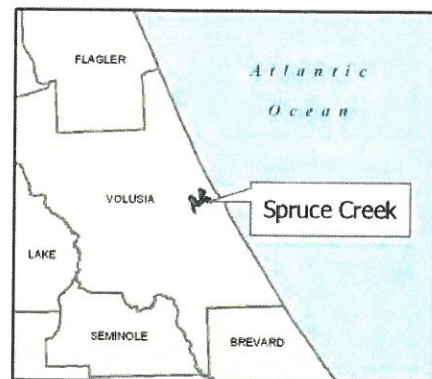
Spruce Creek



SPRUCE CREEK

VOLUSIA COUNTY

-  Florida Forever BOT Project Boundary
-  Acquired for Conservation (Fee Simple)
-  Essential Parcel(s) Remaining
-  State Owned Lands
-  Other Conservation Lands



OCTOBER 2009

Spruce Creek

fee-simple acquisition, sponsored by Volusia County, consisted of a 208-acre portion of the original project and a 316-acre addition totaling 524 acres, multiple owners, and a 1993 taxable value of \$2,124,141. The project boundary, however, included the portions of the project that had already been acquired. The resulting project acreage equaled 1,593 acres with a taxable value of \$3,406,991.

On October 24, 2002, the Acquisition & Restoration Council (ARC) approved a fee-simple 648-acre addition to the project boundary. It was sponsored by Volusia County, consisted of five owners, and a 2002 taxable value of \$1,297,592.

On October 10, 2006, the St. Johns River Water Management District (SJRWMD), in partnership with Volusia County, closed on a 40-acre parcel known as the Eubank/Rosier tract. The total purchase price was \$915,535.

In August 2007, Volusia County acquired 7.08 acres from the Blanchette family.

In December 2007, the City of Port Orange acquired 225 acres on the western boundary from ICI.

On September 19, 2008, the SJRWMD acquired 58.02 acres from the Ford family.

On October 9, 2009, ARC voted to remove 6 sites with 54 individual parcels (97 acres) containing residential and commercial buildings or infrastructure. The total acreage has a just tax-assessed value of \$9,166,381.

Coordination

Volusia County is a partner in the acquisition of this project as well as the manager. SJRWMD and City of Port Orange are acquisition partners also.

Management Policy Statement

The primary goals of management of the Spruce Creek project are to conserve, protect, manage, or restore important ecosystems, landscapes, and forests, in order to enhance or protect significant surface water, coastal, recreational, timber, fish or wildlife resources which local or state regulatory programs cannot adequately protect; to provide areas, including recreational trails, for natural-resource-based recreation; and to preserve significant archaeological or historical sites.

Management Prospectus

Qualifications for state designation The Spruce Creek Recreation Area has the size, natural, cultural, and recreational resources, and surrounding population density to qualify as a State Recreation Area.

Manager Volusia County in cooperation with the State of Florida.

Conditions affecting intensity of management The project includes moderate-need tracts requiring more than basic resource management and protection. These lands will contain more highly developed resource-related recreation facilities. Large portions of the property, however, would be considered low-need tracts requiring only basic resource management and protection. Recreation use will be incorporated but in a more dispersed and less intensive manner.

Timetable for implementing management and provisions for security and protection of infrastructure

Within the first year after acquisition, management activities will concentrate on site security and resource inventory. Volusia County will provide appropriate access to the site to maintain existing and historic uses while protecting sensitive resources on the site. The site's natural resources and listed plants and animals will be inventoried, recreational opportunities and uses identified, and a management plan formulated.

Long-range plans for Spruce Creek will be specified in the management plan and will generally be directed as follows: Development of recreational facilities, a comprehensive trail management program, a comprehensive educational and interpretive program, and a comprehensive historic resource management program; restoration of disturbed areas; maintenance of natural communities through a program of selected harvest and fire management; and habitat enhancement for listed species.

Revenue-generating potential will be determined by the concepts in the Management Plan. Some revenues will probably be generated by user and concession fees at recreation sites. Some revenues may be generated through sale of forest products, but any such revenues will be minimal. Use of small portions of the area as mitigation for development elsewhere would not only restore damaged areas on-site, but would yield revenue as well. It will be several years before potential revenue sources could be fully developed.

Cooperators in management activities Port Orange and New Smyrna Beach both will be involved in the planning of the project.

Spruce Creek

The Museum of Arts and Sciences and the Atlantic Center for the Arts may prove to be valuable partners in optimizing the educational and interpretive opportunities on this site.

The Nature Conservancy still owns the 150 acres that is managed by the Museum of Arts and Sciences. The Environmental Council and Sierra Club have played important roles in the early protection of the creek in-

cluding sponsoring OFW status in 1986. The Southeast Volusia Historical Society and Volusia Anthropological Society have had long-standing interest in protection and interpretation of the cultural, historical and archaeological resources located on the project site. Volunteers will be invaluable in developing, managing, and interpreting this site.

Management Cost Summary

Category Source of Funds	1996/97 Volusia County	1997/98 Volusia County	1998/99 Volusia County
Salary	\$6,240	\$6,240	\$6,240
OPS	\$0	\$0	\$7,712
Expense	\$0	\$0	\$0
OCO	\$0	\$0	\$0
FCO	\$0	\$0	\$0
TOTAL	\$6,240	\$6,240	\$13,952

APPENDIX F:

List of Plant Species Observed by Local Florida Native Plant Society Chapter

Doris Leeper Spruce Creek Preserve

Plant List

<u>Scientific Name</u>	<u>Common Name</u>	<u>FAMILY</u>
1 <i>Acer rubrum</i>	red maple	ACERACEAE
2 <i>Ampelopsis arborea</i>	pepper vine	VITACEAE
3 Andropogon glomeratus var. glaucopsis	Purple bluestem	POACEAE
4 <i>Andropogon</i> spp	Broomsedge	POACEAE
5 <i>Aristida beyrichiana</i>	wiregrass	POACEAE
6 <i>Aristida spiciformis</i>	bottlebrush threeawn	POACEAE
7 <i>Arnoglossum floridanum</i>	Indian Plantain	ASTERACEAE
8 Asimina incana	WOOLLY PAWPAW; POLECAT BUSH	ANNONACEAE
9 <i>Asimina obovata</i>	Flag Pawpaw	ANNONACEAE
10 <i>Asimina parviflora</i>	Small Fruited (Flowered) Pawpaw	ANNONACEAE
11 Asimina pygmaea	DWARF PAWPAW	ANNONACEAE
12 <i>Asimina</i> spp.	pawpaw	ANONACEAE
13 Asparagus aethiopicus	asparagus fern*	ASPARAGACEAE
14 <i>Avicennia germinans</i>	black mangrove	AVICENNIACEAE
15 <i>Baccharis angustifolius</i>	saltbrush	ASTERACEAE
16 <i>Baccharis halimifolia</i>	saltbush	ASTERACEAE
17 <i>Bacopa monnieri</i>	herb-of-grace	PLANTAGINACEAE
18 <i>Batis maritima</i>	saltwort	BATACEAE
19 <i>Bejaria racemosa</i>	tarflower	ERICACEAE
20 <i>Blechnum serrulatum</i>	swamp fern	BLECHNANCEAE
21 <i>Boehmeria cylindrica</i>	false nettle	URTICACEAE
22 <i>Borrchia frutescens</i>	sea ox-eye	ASTERACEAE
23 <i>Callicarpa americana</i>	Beautyberry	LAMIACEAE
	COASTALPLAIN CHAFFHEAD; FLORIDA	
24 Carphephorus corymbosus	PAINTBRUSH	ASTERACEAE
25 Carphephorus odoratissimus	VANILLALEAF	ASTERACEAE
26 <i>Carya floridana</i>	Florida (Scrub) Hickory	JUGLANDACEAE
27 <i>Carya glabra</i>	Pignut Hickory	JUGLANDACEAE
28 <i>Casuarina equisetifolia</i>	Australian pine	CASUARINACEAE
29 <i>Celtis laevigata</i>	hackberry; sugarberry	CELTIDACEAE
30 <i>Centella asiatica</i>	coinwort	ARALIACEAE
31 Cinnamomum camphora	CAMPHORTREE	LAURACEAE
32 <i>Cladonia</i>	deermoss	
33 <i>Clitoria mariana</i>	Butterfly Pea	FABACEAE
34 <i>Coreopsis laevenworthii</i>	Leavonworth's tickseed	ASTERACEAE
35 <i>Cornus foemina</i>	swamp dogwood	CORNACEAE
36 <i>Cyperus</i> spp	flatsedge	CYPERACEAE
37 <i>Dichanthelium ensifolium</i>	witchgrass	POACEAE
38 <i>Dichanthelium</i> spp.	witchgrass	POACEAE
39 Diodia teres	POOR JOE; ROUGH BUTTONWEED	RUBIACEAE
40 <i>Diospyros virginiana</i>	persimmon	EBENACEAE
41 <i>Distichlis spicata</i>	seashore saltgrass	POACEAE
42 <i>Eleocharis</i> spp.	spike rush	CYPERACEAE
43 <i>Epidendrum conopseum</i>	Green Fly Orchid	Epidendrum
44 Erechtites hieraciifolius	FIREWEED	ASTERACEAE
45 <i>Erianthus giganteus</i>	giant plumegrass	POACEAE
46 <i>Erigeron vernus</i>	daisy fleabane	ASTERACEAE
47 Erythrina herbacea	Coralbean	FABACEAE
48 <i>Eupatorium capillifolium</i>	dogfennel	ASTERACEAE

* Denotes exotic species

Doris Leeper Spruce Creek Preserve

Plant List

49 <i>Eupatorium rotundifolium</i>	false hoarhound	ASTERACEAE
50 <i>Eustachys glauca</i>	SALTMARSH FINGERGRASS	POACEAE
51 <i>Euthamia caroliniana</i>	flattop goldenrod	ASTERACEAE
52 <i>Fuirena scirpoidea</i>	SOUTHERN UMBRELLASEDGE	CYPERACEAE
53 <i>Galactia elliotii</i>	milk pea	FABACEAE
54 <i>Gaylussacia tomentosa</i>	dangleberry	ERICACEAE
55 <i>Gelsemium sempervirens</i>	Carolina Yellow Jessamine (vine)	GELSEMIACEAE
56 <i>Gratiola hispida</i>	ROUGH HEDGEHYSSOP	PLANTAGINACEAE
57 <i>Gratiola ramosa</i>	BRANCHED HEDGEHYSSOP	PLANTAGINACEAE
58 <i>Helianthemum corymbosum</i>	PINEBARREN FROSTWEED (rockrose)	CISTACEAE
59 <i>Heliotropium curassavicum</i>	seaside heliotrope	BORAGINACEAE
60 <i>Hypericum cistifolium</i>	St. Johns wort	CLUSIACEAE
61 <i>Hypericum fasciculatum</i>	four-petaled St John's wort	CLUSIACEAE
62 <i>Hypericum hypericoides</i>	St. Andrews Cross	Hypericum
63 <i>Hypericum reductum</i>	sand weed	HYPERICACEAE
64 <i>Hypericum tetrapetalum</i>	St Johns wort	HYPERICACEAE
65 <i>Ilex cassine</i>	dahoon holly	AQUIFOLIACEAE
66 <i>Ilex decidua</i>	Decidious Holly	AQUIFOLIACEAE
67 <i>Ilex glabra</i>	gallberry	AQUIFOLIACEAE
68 <i>Ilex opaca</i>	American Holly	AQUIFOLIACEAE
69 <i>Ilex vomitoria</i>	Yaupon Holly	AQUIFOLIACEAE
70 <i>Ipomoea</i> spp.	morning glory	CONVOLVULACEAE
71 <i>Iva frutescens</i>	bigleaf sumpweed (marshelder)	ASTERACEAE
72 <i>Juncus effusus</i>	soft rush	JUNCACEAE
73 <i>Juncus marginatus</i>	rush	JUNCACEAE
74 <i>Juncus roemerianus</i>	black needle rush	JUNCACEAE
75 <i>Juniperus virginiana</i>	Red Cedar	CUPRESSACEAE
76 <i>Lachnanthes caroliniana</i>	CAROLINA REDROOT	HAEMODORACEAE
	DRYSAND PINWEED; SPREADING	
77 <i>Lechea cf. divaricata</i>	PINWEED	CISTACEAE
78 <i>Limonium carolinianum</i>	sea lavender	PLUMBAGINACEAE
79 <i>Liquidambar styraciflua</i>	sweetgum	ALTINGIACEAE
80 <i>Ludwigia peruviana</i>	Peruvian primrose*	ONAGRACEAE
81 <i>Ludwigia repens</i>	RED LUDWIGIA	ONAGRACEAE
82 <i>Lycium carolinianum</i>	Christmas berry	SOLANACEAE
83 <i>Lyonia ferruginea</i>	rusty lyonia	ERICACEAE
84 <i>Lyonia fruticosa</i>	fetterbush	ERICACEAE
85 <i>Lyonia lucida</i>	shiny lyonia	ERICACEAE
86 <i>Macroptilium lathyroides</i> *		FABACEAE
87 <i>Magnolia grandiflora</i>	Southern Magnolia	MAGNOLIACEAE
88 <i>Mikania scandens</i>	hempvine	ASTERACEAE
89 <i>Monanthochloe keyensis</i>	key grass	POACEAE
90 <i>Monotropa uniflora</i>	Indian Pipes (dried)	ERICACEAE
91 <i>Myrica cerifera</i>	wax myrtle	MYRICACEAE
92 <i>Osmanthus megacarpa</i>	Wild Olive	OLEACEAE
93 <i>Panicum virgatum</i>	switchgrass	POACEAE
94 <i>Parthenocissus quinquefolia</i>	Virginia creeper	VITACEAE
95 <i>Paspalum notatum</i>	bahiagrass	POACEAE
96 <i>Paspalum urvillei</i> *	VASEYGRASS	POACEAE
97 <i>Passiflora incarnata</i>	maypop	PASSIFLORACEAE
98 <i>Persea borbonia</i>	Red Bay	LAURACEAE
99 <i>Persea humilis</i>	Silk Bay	LAURACEAE

* Denotes exotic species

Doris Leeper Spruce Creek Preserve

Plant List

100 <i>Persea palustris</i>	swamp bay	LAURACEAE
101 <i>Phlebodium aureum</i>	goldfoot fern	POLYPODIACEAE
102 <i>Photinia pyrifolia</i>	choke cherry	ROSACEAE
103 <i>Phyla nodiflora</i>	Frogfruit	VERBENACEAE
104 <i>Physalis</i> sp.	GROUNDCHERRY	SOLANACEAE
105 Pinguicula caerulea	BLUEFLOWER BUTTERWORT	LENTIBULARIACEAE
106 <i>Pinus clausa</i>	Sand Pine	PINACEAE
107 <i>Pinus elliotii</i>	slash pine	PINACEAE
108 <i>Pinus serotina</i>	pond pine	PINACEAE
109 Pinus taeda	loblolly pine	PINACEAE
Pleopeltis polypodioides var.		
110 michauxiana	Resurrection Fern	POLYPODIACEAE
111 <i>Pluchea</i> spp.	camphorweed	ASTERACEAE
112 <i>Polygala lutea</i>	orange milkwort	POLYGALACEAE
113 <i>Polygonum</i> sp.	smartweed	POLYGONACEAE
114 <i>Proserpinaca pectinata</i>	mermaidweed	HALORAGACEAE
115 <i>Prunus caroliniana</i>	Carolina Cherrylaurel	ROSACEAE
116 <i>Prunus serotina</i>	Black Cherry	ROSACEAE
117 <i>Pteridium aquilinum</i>	Bracken	DENNSTAEDTIACEAE
Pteridium aquilinum var.		
118 latiusculum	bracken fern	DENNSTAEDTIACEAE
119 <i>Pterocalum virgatum</i>	blackroot, rabbit tobacco	ASTERACEAE
120 <i>Ptilimnium capillaceum</i>	mock bishop weed	APIACEAE
121 <i>Quercus chapmanii</i>	Chapman's Oak	FAGACEAE
122 <i>Quercus geminata</i>	sand live oak	FAGACEAE
123 <i>Quercus laurifolia</i>	Laurel Oak	FAGACEAE
124 <i>Quercus minima</i>	DWARF LIVE OAK	FAGACEAE
125 <i>Quercus myrtifolia</i>	Myrtle Oak	FAGACEAE
126 <i>Quercus virginiana</i>	live oak	FAGACEAE
127 <i>Rhexia lutea</i>	yellow meadowbeauty	MELASTOMATACEAE
128 <i>Rhus copallina</i>	Winged Sumac	ANACARDIACEAE
129 <i>Rhynchospora latifolia</i>	star rush	CYPERACEAE
130 <i>Rhynchospora megalocarpa</i>	Big Nut Sedge	CYPERACEAE
131 <i>Rhynchospora</i> spp	beaksedge	CYPERACEAE
132 <i>Rubus argutus</i>	BLACKBERRY	ROSACEAE
133 <i>Rubus trivialis</i>	dewberry	ROSACEAE
134 <i>Sabal etonia</i>	Sabal Minor	ARECACEAE
135 <i>Sabal palmetto</i>	Sabal Palm	ARECACEAE
136 <i>Sabatia grandiflora</i>	rosegentian	GENTIANACEAE
137 <i>Sagittaria lancifolia</i>	arrowhead	ALISMATACEAE
138 Salicornia bigelovii	annual glasswort	AMARANTHACEAE
139 <i>Salix caroliniana</i>	Carolina willow	SALICACEAE
140 <i>Sambucus canadensis</i>	elderberry	ADOXACEAE
141 <i>Samolus ebracteatus</i>	water pimpernel - ebract	SAMOLACEAE
142 <i>Sapindus marginatus</i>	Florida Soapberry	SAPINDACEAE
143 Sapium sebiferum	Chinese tallow*	EUPHORBIACEAE
144 Sarcocornia ambigua	swampfire (perennial glasswort)	AMARANTHACEAE
145 Saururus cernuus	LIZARD'S TAIL	SAURURACEAE
146 <i>Schinus terebinthifolius</i>	Brazilian pepper	ANACARDIACEAE
147 <i>Schinus terebinthifolius</i>	Brazilian pepper*	ANACARDIACEAE
148 <i>Scirpus</i> sp.	bulrush	CYPERACEAE
149 <i>Scleria</i> spp	white nut sedge	CYPERACEAE

* Denotes exotic species

Doris Leeper Spruce Creek Preserve

Plant List

150	<i>Scoparia dulcis</i>	sweetbroom	PLANTAGINACEAE
151	<i>Scutellaria integrifolia</i>	skullcaps	LAMIACEAE
152	<i>Seranoa repens</i>	Saw Palmetto	ARECACEAE
153	<i>Sesuvium portulacastrum</i>	sea purslane	AIZOACEAE
154	<i>Setaria parviflora</i>	foxtail	POACEAE
155	Sisyrinchium angustifolium	NARROWLEAF BLUE-EYED GRASS	IRIDACEAE
156	<i>Smilax auriculata</i>	ear-leafed smilax	SMILACACEAE
157	<i>Smilax glauca</i>	greenbriar	SMILACACEAE
158	<i>Smilax pumila</i>	Sarsaparilla (vine)	SMILACACEAE
159	<i>Smilax spp</i>	Smilax (vine)	SMILACACEAE
160	<i>Solidago sempervirens</i>	seaside goldenrod	ASTERACEAE
161	<i>Solidago spp</i>	Goldenrod	ASTERACEAE
162	<i>Solidago spp.</i>	goldenrod	ASTERACEAE
163	<i>Solidago spp.</i>	goldenrod	ASTERACEAE
164	<i>Spartina alterniflora</i>	smooth cordgrass	POACEAE
165	<i>Spartina bakerii</i>	cordgrass	POACEAE
166	<i>Sphagnum</i>	sphagnum moss	
167	<i>Sporobolus virginicus</i>	coastal dropseed	POACEAE
168	<i>Suaeda linearis</i>	sea blite	AMARANTHACEAE
169	<i>Symphyotrichum tenuifolium</i>	perennial saltmarsh astor	ASTERACEAE
170	Syngonanthus flavidulus	YELLOW HATPINS	ERIOCAULACEAE
171	Tillandsia recurvata	ballmoss	BROMELIACEAE
172	Tillandsia usneoides	Spanish moss	BROMELIACEAE
173	<i>Toxicodendron radicans</i>	poison ivy	ANACARDIACEAE
174	<i>Typha latifolia</i>	cattail	TYPHACEAE
175	<i>Ulmus americana</i>	elm	ULMACEAE
176	<i>Urena lobata</i>	Caesar's weed*	MALVACEAE
177	<i>Utricularia sp.</i>	bladderwort	LENTIBULARIACEAE
178	<i>Vaccinium arboreum</i>	Sparkleberry	ERICACEAE
179	<i>Vaccinium myrsinites</i>	shiny blueberry	ERICACEAE
180	<i>Vaccinium myrsinites</i>	shiny blueberry	ERICACEAE
181	<i>Vaccinium myrsinites</i>	Shiny Blueberry	ERICACEAE
182	<i>Vaccinium stamineum</i>	Deerberry	ERICACEAE
183	<i>Vaccinium stamineum</i>	deerberry	ERICACEAE
184	<i>Vaccinium stamineum</i>	deerberry	ERICACEAE
185	Vicia acutifolia	narrowleaf	FABACEAE
186	<i>Vigna luteola</i>	cow pea	FABACEAE
187	<i>Vitis rotundifolia</i>	muscadine grape vine	VITACEAE
188	<i>Vitis spp</i>	Grape (vine)	VITACEAE
189	Vittaria lineata	shoestring fern	VITTARIACEAE
190	<i>Woodwardia virginica</i>	Virginia chain fern	BLECHNACEAE
191	<i>Ximenia americana</i>	Hog Plum (Deer Apple/Tallow Wood)	XIMENIACEAE
192	<i>Xyris elliotii</i>	yellow-eyed grass	XYRIDACEAE
193	<i>Zamia pumila</i>	Coontie	ZAMIACEAE
194		Deermoss	
195		Old Man's Beard Lichen	
196		Red Blanket Lichen	

* Denotes exotic species

APPENDIX G:
Scrub-Jay Survey

Florida Scrub-Jay Survey Report

Doris Leeper Spruce Creek Preserve
Volusia County, Florida

ZC # 10041

October 25, 2010

Prepared By:
Zev Cohen & Associates
Attention: Jody N. Sisk
4475 US 1 South, Suite 601
St. Augustine, FL 32086

Prepared For:
Volusia County Growth and Resource Department
Division of Land Acquisition and Management
Attention: Randy Sleister
123 West Indiana Ave., Room 201
DeLand, FL 32720

Submitted To:
U.S. Fish and Wildlife Service
North Florida Field Office
Attn: Erin Gawera
7915 Baymeadows Way, Suite 200
Jacksonville, FL 32256-7517



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- Aerial Map
- Quadrangle Map
- Soils Map
- Habitat Map
- Scrub-Jay Survey Location Map
- Florida Scrub-Jay Family Map

Appendix B – Species

- Wildlife Species Observed List

1.0 INTRODUCTION

Zev Cohen and Associates, Inc. (ZCA) was contracted by the Volusia County Growth and Resource Department, Land Acquisition and Management Division, to survey the Doris Leeper Spruce Creek Preserve property (hereafter referred to as the Preserve) for the presence of Florida scrub-jays (*Aphelocoma coerulescens coerulescens*). The Preserve is located along the Spruce Creek from US 1 to I-95 in Volusia County, Florida, within Sections 25, 26, 35, 36, Township 16S, Range 33E. The Preserve consists of approximately 2000 acres of a variety of natural communities (See attached Aerial Map and Quadrangle Map for details). The goal of this survey was to identify the presence/absence of the Florida scrub-jay within the Preserve. The results of this survey will provide Volusia County with a detailed description of the natural communities within the Preserve and provide recommendations for land management techniques which would enhance the communities to provide suitable habitat for the Florida scrub-jay.

2.0 BACKGROUND INFORMATION

The Florida scrub-jay is listed as Threatened by the U.S. Fish and Wildlife Service (USFWS) and the Florida Fish and Wildlife Conservation Commission (FWC), pursuant to the Federal Endangered Species Act (50 C.F.R. 17.11) and the Florida Administrative Code (Chapter 39-27.002, F.A.C.), respectively. The most significant difference between these regulations is that the ESA specifically protects the loss of habitat and not just the loss of the species. The ESA protects scrub-jays from being “killed, harassed, taken”, etc. either directly or indirectly. A direct taking would include destroying a nest with young in the nest or the killing of an adult. An indirect or incidental taking would involve the development of occupied habitat leading to habitat destruction, even if the birds were not directly harmed. The habitat loss prevents the birds from using the site for portions of their life cycle and eventually leads to their destruction. Generally, the Florida Administrative Code only protects the species from a direct taking.

Scrub-jays inhabit oak scrub communities with nearby open sandy areas. Scrub-jays typically nest in dense scrub oak pockets. Dense scrub oak sub-canopies provide protection from predatory raptors and domestic cats. This protection is critical to the survival of scrub-jays, which are brightly colored birds with poor evasive flying abilities. Typically, scrub-jays stay relatively close to or on the ground. Scrub-jays generally hop along the ground and between dense shrubby vegetation while foraging. The primary vegetative source of food for the Florida scrub-jay is acorns, however scrub-jays are known to eat certain insect larvae. The proximity of open sandy areas for acorn caching is critical to the species, as the individuals are vulnerable to predation for shorter periods of time when the caching areas are closer to dense protective vegetation. Areas of dense oak and pine canopy cover and areas of extensive saw palmetto are of limited suitability to scrub-jays.

Scrub-jays exemplify cooperative breeding, which means offspring from previous nesting cycles remain to help the parental adults raise future offspring. Scrub-jay families typically consist of an adult pair, plus 1-10 adult and juvenile helpers. The presence of 1 or 2 helpers per adult pair is typical, thus typical family size is three to four individuals.

3.0 METHODS

3.1 Background Research

A background literature search was conducted to determine if scrub-jays have been documented on the Preserve or in the vicinity. Where available, distribution and observation data were reviewed from the following sources: the Florida Natural Areas Inventory (FNAI), the Florida Committee on Rare and Endangered Plants and Animals (FCREPA) publications, the FWC, the USFWS, Florida Audubon Society and through consulting other published reference materials such as Cox (1987). In addition, ZCA's *Florida Scrub-Jay Database* (a Zev Cohen proprietary database comprised of data acquired from several agencies, direct observations, and scientific journals) was reviewed to obtain location data recorded by others.

3.2 Habitat Evaluation

An inventory of the wildlife habitat found within the Preserve was made, and a Habitat Map was produced using the Florida Natural Areas Inventory Guide to the Natural Communities of Florida: 2010 Edition. Notes and observations for each habitat type were recorded by dominant species for each vegetative stratum. Additionally, the site was evaluated for the type of scrub-jay habitat (Type I, Type II, or Type III Habitat). Type I, II, and III habitats are varying degrees of suitable scrub-jay habitat as described in Fitzpatrick *et. al.*, (1991):

- Type I Habitat – Any upland plant community in which percent cover of the substrate by scrub oak species is 15% or more.
- Type II Habitat – Any plant community not meeting the definition of Type I habitat, in which one or more scrub oak species is represented [the presence of any amount of scrub oak is the key indicator].
- Type III Habitat – Any upland or seasonally dry wetland within ¼ mile of any area designated as Type I or Type II habitat.

3.3 Scrub-jay Field Survey

ZCA, along with Volusia County Environmental staff, surveyed the Preserve in accordance with the techniques outlined in Fitzpatrick *et. al.*, (1991). The survey consisted of the playback of recorded scrub-jay vocalizations at stations that were located

to provide broadcast coverage of the entire site as well as broadcasts off-site without trespassing on private land (see attached Scrub-Jay Survey Map). The location of each station was located using a hand-held GPS unit (Garmin eTrex Venture personal navigator). The recorded locations are accurate to within 3 meters. A portable compact disc player (Sony Atrac3plus Model No. ZS-XN30) was used to broadcast recordings of scrub-jay scolding and territory advertisement calls. The audio track was excerpted from Keller (1997). Typically, when these calls are played in an occupied scrub-jay territory, the resident jays will respond to the playback with calls of their own and visual displays in an attempt to locate and challenge the perceived intruder. The surveys were started in the morning hours and documented in daily field notes. The CD was not played during any precipitation, or in the presence of observed predators. The vocalizations played were unobstructed by other loud noises as the major roadways in the area are buffered by the trees found within the Preserve.

The survey protocol also followed guidelines provided by the USFWS North Florida Field Office, in their document, *Scrub-Jay Survey Guidelines*, which was adapted from Fitzpatrick *et. al.*, (1991). The survey also incorporated the guidelines provided by the USFWS North Florida Field Office, in their document, *Florida Scrub-Jay Urban Survey Protocol*.

4.0 RESULTS

4.1 Background Research

Background research in the vicinity of the subject property revealed the potential presence of five (5) Florida scrub-jay populations/families, within a two mile radius. The potential areas include four (4) known families within one mile south of the western parcel and one (1) family directly south of the eastern most parcel (see Florida Scrub-Jay Family Map, attached). No Florida scrub-jays have been documented on the subject property. Please note that the data used for this map includes data from the original statewide surveys conducted in 1992 and 1993 (Fitzpatrick *et al.*). Many of the scrub-jay families represented potentially no longer occur in the area due to development and predation.

4.2 Habitat Descriptions

The following is a description of the cover type listed by its designated FNAI community (see attached Habitat Map). Included in the descriptions are land management recommendations which could return the habitats which have a high potential to occupy Florida scrub-jay families back to historical conditions.

Natural Communities:

Hardwood Forested Uplands

Mesic Hammock – Mesic hammocks are well developed hardwood and/or palm forests on rarely inundated soils. The canopy is typically closed and dominated by live oak (*Quercus virginiana*), cabbage palm (*Sabal palmetto*), southern magnolia (*Magnolia grandiflora*), and pignut hickory (*Carya glabra*). The mesic hammocks found at the Preserve are dominated by the canopy trees mentioned above and the canopy is closed. The understory consists of saw palmetto (*Serenoa repens*), American beautyberry (*Callicarpa americana*), gallberry (*Ilex glabra*), sparkleberry (*Vaccinium arboreum*), yaupon holly (*Ilex vomitoria*) and wax myrtle (*Myrica cerifera*).

Mesic hammocks are not considered fire-adapted communities. With that in mind the mesic hammocks found at the Preserve, as like many throughout central and northeast Florida, are very healthy and functioning superbly. The most common disturbance is logging, understory clearing, cattle grazing, and introduction of feral hogs. The disturbances mentioned above have not occurred at the Preserve.

High Pine and Scrub

Scrub (Type I Habitat) – Scrub is a community composed of evergreen shrubs, with or without a canopy of pines, and is found on dry, infertile, sandy ridges. Scrub is dominated by myrtle oak (*Quercus myrtifolia*), sand live oak (*Quercus geminate*), Chapman's oak (*Quercus chapmanii*), sand pine (*Pinus clausa*), Florida rosemary (*Ceratiola ericoides*), rusty lyonia (*Lyonia ferruginea*), and saw palmetto. The oaks form a dense cover interspersed with patchy openings that consist of bare sand with a sparse cover of herbs, particularly threeawns (*Aristida* spp.), hairsedges (*Bulbostylis* spp.), sandyfield beaksedge (*Rhynchospora megalocarpa*), pinweeds (*Lechea* spp.), jointweeds (*Polygonella* spp.), and ground lichens (*Ladonia leporine*, *Cladonia prostrate*, *Cladina subtenuis*, and *Cladina evansii*).

Florida scrub is home to a multitude of rare animals. This includes the Florida scrub-jay, scrub lizard (*Sceloporus woodi*), gopher tortoise (*Gopherus polyphemus*), Florida mouse (*Peromyscus floridanus*), short-tailed snake (*Stilosoma extenuatum*), gopher frog (*Rana capito*), and many other species.

While scrub is a fire-maintained community, it is not easily ignited. Scrub is thought to have burned less frequently than communities with a more easily ignited grassy groundcover, such as sandhill or mesic flatwoods. Scrub oak dominated scrub, as found within the Preserve, likely burned naturally at intervals between 5 and 20 years based on the habitat requirements of the Florida scrub-jay. Oak height is a critical limiting factor

for Florida scrub-jays which have been documented to abandon territories where the oaks reached >3 meters. A minimum of five years is based on the time required for re-sprouting oak stems to reach acorn-bearing height.

Growth rates of scrub oaks are related to burn history and environmental conditions onsite. Long unburned oak scrub, which comprises the Preserve, may attain heights unsuitable for scrub-jays up to 50 percent faster after fire than regularly burned oak scrub and thus may at first require shorter burn intervals to maintain optimum heights following restoration of burning. In addition, small openings, needed by Florida scrub-jays for caching acorns, may need to be artificially restored in long unburned scrub by piling up fuel to create hotspots that kill the roots of the oaks.

Pine Flatwoods and Dry Prairie

Wet Flatwoods – Wet flatwoods are pine forests with a sparse or absent midstory and a dense groundcover of hydrophytic grasses, herbs, and low shrubs. The canopy of the wet flatwoods within the Preserve consists of planted slash pine (*Pinus elliottii*). The subcanopy consists of loblolly bay (*Gordonia lasianthus*), swamp bay (*Persea palustris*), dahoon holly (*Ilex cassine*), and wax myrtle. The shrub layer is dominated by gallberry, shiny yonina, and saw palmetto. The herbaceous layer consists primarily of wiregrass (*Aristida stricta*), blue maidencane (*Amphicarpum muhlenbergianum*), Carolina redroot (*Lachnanthes carolina*), beaksedges (*Rhynchospora* spp.), and maidencane (*Panicum hemitomon*). Due to this site being fire suppressed the shrub layer is more abundant compared to the herbs.

Wet flatwoods tend to have a longer fire interval than upland pine flatwoods in the order of 5 to 7 years. If the interval is too long, 7 to 10 years, it can lead to an increase in woody species cover and a decline in grasses and forb cover. Many factors other than frequency of fire, such as season of fire, pre- and post-fire soil moistures, groundwater levels, weather, plant size or age at the time of fire, can greatly influence tree mortality and vegetation response to fire. Fire in the growing season can reduce the stature of woody vegetation, particularly hardwoods, prevent increases in shrub densities, and promote flowering of herbaceous groundcover.

Mesic Flatwoods (Type I Habitat) – Mesic flatwoods are generally characterized by an open canopy of tall pines and dense ground cover including shrubs, grasses, and forbs. Historically this community's canopy was dominated by longleaf pine (*Pinus palustris*). Today the majority of mesic flatwoods found throughout central and northeastern Florida are dominated by dense stands of slash pine due to the pine silviculture industry and furthermore by prolonged periods of fire exclusion. The canopy found within the mesic flatwoods of the Preserve is comprised mostly of slash pine. The ground cover is dominated by a heavy cover of saw palmetto and gallberry. In natural state, mesic flatwood herbaceous cover is dominated by wiregrass, dropseeds (*Sporobolus* spp.),

panicgrasses (*Dichanthelium* spp.), and broomsedges (*Andropogon* spp.). Limited areas of wiregrass, or other herbaceous cover, are found within the mesic flatwoods of the Preserve due to fire exclusion.

Mesic flatwoods require frequent fire (2 to 4 year intervals). Longleaf pines have thick bark to protect them from fire and their seeds need the mineral soil and open sunlight that fire provides to germinate. Longleaf pine during the grass stage is fire resistant. All of the mesic flatwood constituent plant species recover rapidly from fire and several species require fire to reproduce. Wiregrass requires fire to flower, along with a number of other characteristic herbs. Red-cockaded woodpeckers (*Picoides borealis*), which nest in cavities in mature living pines, will abandon a nesting site if the midstory becomes too tall and dense.

The need for frequent fire to control hardwood and off-site pine invasion has been documented for many years. It is also well documented that fire stimulates flowering in many flatwood herbs and that frequent fire increases species richness and abundance. Controlled burns in mesic flatwoods also indirectly determine the fire frequency and season for all the adjacent natural communities.

Statistics from lightning caused fires suggest that most areas in Florida would naturally burn at the beginning of the lightning season. Growing season fires (April to mid-August) are known to be necessary for flowering and seed set in wiregrass.

Scrubby Flatwoods (Type I Habitat) – Scrubby flatwoods have an open canopy of widely spaced pine trees and a low, shrubby understory dominated by scrub oaks and saw palmetto. Scrubby flatwoods differ from the aforementioned scrub in the presence of wiregrass, a greater abundance of saw palmetto, and/or the presence of typical flatwoods shrubs such as gallberry and fetterbushes. Structurally it differs from scrub in its lack of a continuous cover of scrubby oaks.

The scrubby flatwoods at the Preserve have a canopy of longleaf pine, slash pine, and sand pine. The understory consists of a closed cover of sand live oak, myrtle oak, Chapman's oak, saw palmetto, gallberry, and fetterbush. Some instances of grasses were found which include wiregrass, broomsedge bluestem (*Andropogon virginicus*), and shiny blueberry (*Vaccinium myrsinites*). The majority of the scrubby flatwoods found within the Preserve has a closed canopy of scrub oaks in the 3 to 4 meter range in height due to the lack of fire.

Scrubby flatwoods are often associated with scrub and/or mesic flatwoods. Therefore many of the rare species associated with the aforementioned scrub are also likely to inhabit scrubby flatwoods.

Scrubby flatwoods have a more continuous ground cover than scrub, therefore

historically have burned more readily than scrub. But due to less ground cover grasses scrubby flatwoods tend to burn less readily than mesic flatwoods. Therefore scrubby flatwoods historically have burned at a frequency intermediate of the two, most likely in the 5 to 15 year range. Light ground fires in the surrounding mesic flatwoods tend to enter scrubby flatwoods and extinguish, leading to a patchwork of recently burned and unburned portions, a situation which has been found to be favorable for scrub-jays. Therefore variability in season and frequency of prescribed fires to produce a mosaic of burned and unburned patches would be the most desirable for maintaining high biotic diversity within this community.

Coastal Uplands

Maritime Hammock – Maritime hammock is predominantly evergreen hardwood forest growing on stabilized coastal dunes lying at varying distances from the shore. The maritime hammocks found within the Preserve have a closed canopy dominated by live oak, cabbage palm, southern magnolia, and pignut hickory. The subcanopy is dominated by red cedar (*Juniperus virginiana*), yaupon holly (*Ilex vomitoria*), saw palmetto, Brazilian pepper, red bay (*Persea borbonia*), wild coffee (*Psychotria nervosa*), wax myrtle, and wild orange (*Citrus* spp.). The invasive exotic Australian pine (*Casuarina equisetifolia*) was also noted within the maritime hammock communities of the Preserve.

Fire is naturally rare in this community. Fire could weaken the canopy trees making them more susceptible to damage by other coastal stresses. Invasion by exotic species such as Brazilian pepper and Australian pine following storm and wind disturbance is an ongoing threat to the community. Also the composition of maritime hammock is in danger to be affected by the Laurel Wilt Disease, which is fatal to red bays over 1 inch in dbh. This disease is caused by an exotic wood-boring beetle (*Xyleborus glabratus*). The loss of red bays within the subcanopy could potentially lead to further invasion by Brazilian pepper.

Freshwater Non-Forested Wetlands

Wet Prairie – Wet prairie is an herbaceous community found on continuously wet, but not inundated, soils on somewhat flat or gentle slopes between lower lying depression marshes, shrub bogs, or dome swamps and slightly higher wet or mesic flatwoods, or dry prairie. The wet prairies found within the Preserve are small depressions adjacent to wet flatwoods and mesic flatwoods. The groundcover consists primarily of yellow eyed grass (*Xyris* spp.), St. John's wort (*Hypericum fasciculatum*), maidencane, beaksedges, and Carolina redroot.

Natural fires likely entered wet prairies from surrounding pine flatwoods and burned through them when they were dry enough to carry fire. It is estimated that wet prairies found adjacent to pine flatwoods historically had a fire interval of 2 to 4 years. In

absence of fire, shrubs and trees invade wet prairie and shade out the light-loving herbaceous species. Further evidence of fire interval is the necessity of many of the dominant grasses that require fire to stimulate flowering. Wet prairies are sensitive to relatively slight physical alterations to the soil surface which can permanently alter the hydrology. Such disturbances include soil rutting by human disturbance or hog rooting. These disturbances can cause major changes in species composition that require expensive restoration to repair.

Freshwater Forested Wetlands

Coastal Hydric Hammock – Coastal hydric hammock is an evergreen hardwood and/or palm forest with a variable understory typically dominated by palms and ferns occurring on moist soils, often with limestone very near the surface. While species composition varies, the community generally has a closed canopy of oaks and palms, an open understory, and a sparse to a moderate groundcover of grasses and ferns. The coastal hydric hammock found within the Preserve has a canopy which is 100% cabbage palm. The subcanopy consists of swamp bay, wax myrtle, and saw palmetto. The herbaceous cover is dominated by Virginia chain fern (*Woodwardia virginica*), cinnamon fern (*Osmunda cinnamomea*), and royal fern (*Osmunda regalis* var. *spectabilis*).

Fire is not considered an important component of coastal hydric hammock dynamics; however they do burn occasionally. Due to this coastal hydric hammock being dominated by old growth cabbage palm fire most likely occurred historically. Cabbage palms are fire tolerant and intense fires favor the species. Feral hogs tend to be the most common cause of disturbance to this habitat. Hog rutting causes soil disturbance which can allow the spread of the exotic Brazilian pepper as it is found directly adjacent to this habitat.

Bottomland Forest – Bottomland forest is a deciduous, or mixed deciduous/evergreen closed-canopy forest within riverine floodplains and in shallow depressions. The dominate canopy species found within this community at the Preserve include laurel oak (*Quercus laurifolia*), sweetbay (*Magnolia virginiana*), cabbage palm, swamp tupelo (*Nyssa sylvatica* var. *biflora*), water oak (*Quercus nigra*), sugarberry (*Celtis laevigata*), American elm (*Ulmus americana*), water hickory (*Carya aquatica*), and red maple (*Acer rubrum*). The understory consists of swamp dogwood (*Cornus foemina*), dahoon holly (*Ilex cassine*), swamp bay, shiny lyonia (*Lyonia lucida*), and wax myrtle.

Bottomland forests are a preferred habitat for the Florida black bear (*Ursus americanus floridanus*) as they roam along the banks of streams and riverine systems.

Bottomland forests are not considered fire-adapted communities. The most common disturbance of bottomland forest is logging and introduction of feral hogs. The bottomland forests found within the Preserve do not appear to have been logged in the

past and hog presence was not found. Other disturbances such as man made dikes or dams which do not allow for adequate drainage also cause considerable damage to bottomland forests. No damming or diking has occurred within the Preserve.

Marine and Estuarine Vegetated Wetlands

Salt Marsh – Salt marsh is a largely herbaceous community that occurs in the portion of the coastal zone affected by tides and seawater and protected from large waves, either by the broad, gently sloping topography of the shore, by a barrier island, or by location along a bay or estuary. In the case of the Preserve the salt marshes are protected from wave activity by barrier islands. The dominate species is saltmarsh cordgrass (*Spartina alterniflora*) and needle rush (*Juncus roemerianus*). The landward edge of the marsh consists of sawgrass (*Cladium jamaicense*), saltmeadow cordgrass (*Spartina patens*), marsh elder (*Iva frutescens*), sea oxeye daisy (*Borrchia frutescens*), and christmasberry (*Lycium carolinianum*). The salt marshes within the Preserve also have sporadic black mangroves (*Avicennia germinans*) found throughout.

Salt marshes, along with mangrove swamps, are some of the most biologically productive natural communities in the world. The base of the food chain is supplied not only by the rooted plant matter, but also by the algae and detritus found of the stems of plants, on the sediment surface, and suspended in the water column of pools and tidal creeks.

Fire is known to occur in salt marshes, although sporadically, either by spreading from adjacent uplands or from lightning strikes in the marsh itself.

Ditch/canal features are found in a portion of the salt marshes on the Preserve. The ditching is consistent to what occurred in the area in the 1950's and 1960's which is referred to as dragline ditching. The purpose of the ditches was to interrupt the life cycle of saltmarsh mosquitoes (*Aedes taeniorhynchus*, *A. sollicitans*) by altering their breeding sites. Saltmarsh mosquitoes lay their eggs on moist soils. These eggs hatch in huge numbers when the marsh is flooded by tides or rain. Dragline ditching converts large acreages to ditch and spoil piles while altering the hydrology of the remaining wetland and providing access for mosquito-eating fish. The ditches are mostly open water due to the depth. Along the edges nuisance species such as cattail (*Typha* spp.) and Carolina willow (*Salix caroliniana*) dominate the plant composition. Backfilling of these historic mosquito ditches has been a very successful form of salt marsh restoration throughout the state.

Mangrove Swamp – Mangrove swamps are dense forests occurring along relatively flat, low wave energy, marine and estuarine shorelines. Four species of mangroves occur in Florida consisting of red mangrove (*Rhizophora mangle*), black mangrove, white mangrove (*Laguncularia racemosa*), and buttonwood (*Conocarpus erectus*). The four species can occur either in mixed stands or often in differentiated, monospecific zones

that reflect varying degrees of tidal influence, levels of salinity, and types of substrate. Red mangroves often dominate the lowest (deep water) zone, followed by black mangroves, then white, and finally buttonwoods which are normally found within the transition zone between the upland and wetland limits.

Mangrove swamps often exist with no understory, although in some open areas species such as sea-oxeye daisy, marsh elder, saltwort (*Batis maritima*), and giant leatherfern (*Acrostichum danaeifolium*) may be found.

The biological importance of mangrove swamps is well documented as numerous marine and estuarine organisms depend on the swamps for a portion of their life cycle. The continuous shedding of mangrove leaves and other plant components also produce as much as 80 percent of the total organic material available in the aquatic food web. Mangrove swamps are considered one of the most productive forest systems in the world. Mangrove swamps provide important habitat for many rare and endangered flora and fauna and also functions as nursery grounds for many of Florida's commercially and recreationally important fish and shellfish.

Mangroves continue to face survival pressure resulting from oil spills, altered tidal flows, and changes in the quantity, quality, and timing of the fresh water input as a result of development of adjacent uplands. Mangrove swamps are sensitive to colonization by exotic species such as Brazilian pepper (*Schinus terebinthifolius*) and Australian pine (*Casuarina equisetifolia*). Both of the above species have been observed within the Preserve. Management of the mangrove swamps within the Preserve should include the hand removal of any of the above exotic species found within the existing mangrove swamps.

Rivers and Streams (Riverine)

Blackwater Stream - The open water areas within the Preserve include the tidal waters of the Spruce Creek and Murray Creek. These tidal creek systems, due to proximity to the Ponce Inlet, provide extremely valuable habitat for commercial marine species that spend all or part of their life cycle in tidal creeks which include mullet (*Mugil* spp.), spot (*Leiostomus xanthurus*), blue crabs (*Callinectes sapindus*), oysters (*Crassostrea virginica*), and shrimp (*Penaeus* spp.). The smaller minnows and juvenile fish in the tidal creeks provide food for many recreationally important, predatory fish, such as tarpon (*Megalops atlanticus*), snook (*Centropomus undecimalis*), red drum (*Sciaenops ocellatus*), and spotted seatrout (*Cynoscion nebulosus*).

Altered Landcover Types

Clearing – A portion of the pine mesic flatwoods in the northeast portion of the Preserve burned recently. The fire was extremely hot causing all the canopy trees along with the

understory to die. As a safety precaution all the trees were toppled and then removed. The area remains as cleared with sporadic vegetation.

Impoundment/Artificial Pond – Two impoundments occur within the Preserve. One is a large human made pond (approximately 35 acres) found on the eastern side of the Preserve. The pond is tidally influenced and appears to be shallow across. Ponds of this nature were created in the past as duck ponds for hunters to use during the duck migrations in the spring and fall.

A smaller freshwater borrow pond is located on the western side of the Preserve. This pond was used as a dirt mine in the past for use as fill. The side slopes drop dramatically and only a small littoral shelf is present.

Improved pasture – A small portion of improved pasture is included within the Preserve. This area consists of actively maintained bahiagrass (*Paspalum notatum*). It is currently used for parking equestrian trailers used by visitors of the Preserve. Gopher tortoises actively use this area for forage and a few burrows were also identified.

Successional Hardwood Forest – This habitat is found along a canal which was historically draglined through a wetland hardwood forest. The existing vegetation consists of a canopy of laurel oak, slash and longleaf pine, cabbage palm, sugarberry, and southern magnolia.

4.3 Field Survey

The scrub-jay survey was conducted over 5 consecutive days starting on 26 July 2010 and ending on 30 July 2010 (see attached list of species observed). Survey times generally began in the early morning hours (6:30 am) and generally ended around 10:00 a.m. Weather conditions were generally optimal with good visibility, no precipitation, calm winds, and temperatures within the acceptable range. Multiple teams of 2 biologists were used to cover the 88 survey stations within the appropriate times. One scrub-jay responded to the vocalization recording at station 1-27. The one scrub-jay observed flew from south of the property to the southern boundary to respond to the voice recording. It then flew back offsite and did not return. This sighting occurred on 28 July 2010, and the scrub-jay was not seen at any other locations or on other days. No scrub-jays were documented throughout the rest of the entire property demonstrating that the habitats need appropriate land management.

5.0 DISCUSSION

The Florida scrub-jay inhabits fire dominated, low-growing, oak scrub habitat found on well-drained sandy soils. They may persist in areas with sparser oaks or scrub areas that are overgrown, but at much lower densities and with reduced survivorship. Oak height is a critical limiting factor for Florida scrub-jays which have been documented to abandon

territories where the oaks reached >3 meters. The mesic flatwoods, scrubby flatwoods, and scrub found within the Preserve provide the potential for valuable acreage which could be utilized by local scrub-jay families and offspring. Prescribed fire within the above habitats is essential to re-establish these areas as optimum Florida scrub-jay habitats.

As stated previously, the continued existence of the Florida scrub-jay species will depend on preservation and long-term management of suitable scrub habitat. The three habitats above represent approximately 815.76 acres of the Doris Leeper Spruce Creek Preserve (mesic flatwoods – 281.59 acres, scrub – 280.04 acres, and scrubby flatwoods – 254.13 acres). With the presence of multiple Florida scrub-jay families within two miles of the Preserve the importance of managing the habitats to there appropriate historical state is of immeasurable value.

5.0 CONCLUSION

Zev Cohen and Associates has conducted a Florida scrub-jay (*Aphelocoma c. coerulescens*) survey for the subject property. Research data shows that potentially five (5) Florida scrub-jay populations/families, within a two mile radius. The potential areas include four (4) known families within one mile south of the western parcel and one (1) family directly south of the eastern most parcel. One scrub-jay responded to the vocalization recording at station 1-27. The one scrub-jay observed flew from south of the property to the southern boundary to respond to the voice recording. It then flew back offsite and did not return. No scrub-jays were documented throughout the rest of the entire property demonstrating that the habitats need appropriate land management.

Zev Cohen and Associates, Inc. is seeking concurrence from USFWS that the Florida scrub-jay does not occupy the Doris Leeper Spruce Creek Preserve in its present state due to the overgrown condition of the potential scrub-jay habitats onsite.

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10041_SJ report
Enclosures

APPENDIX A

FIGURES



 **Property Limits**
state owned parcels

Source : 2006 Volusia County True Color Aerials

Date : 08/16/10

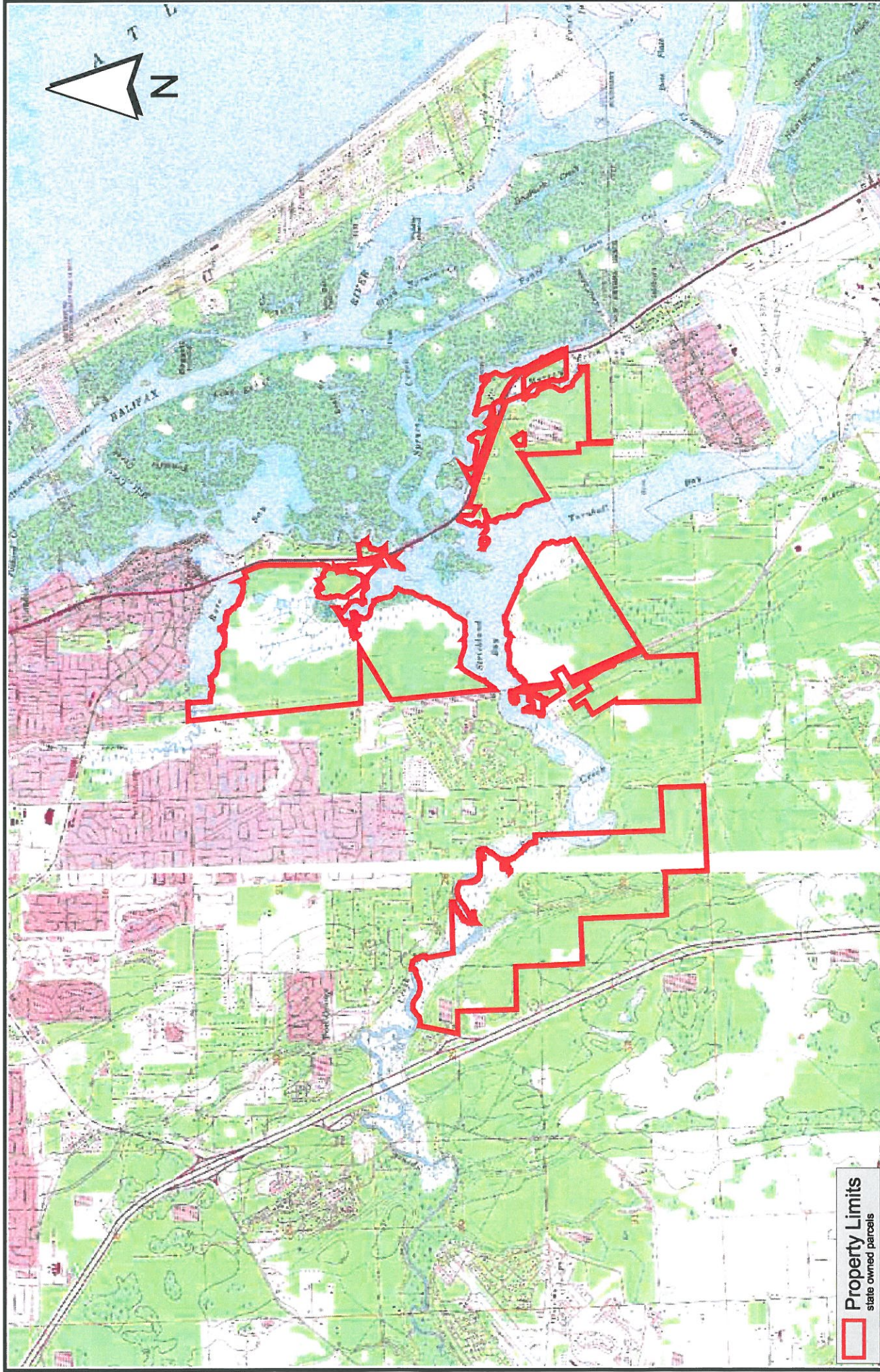
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AERIAL MAP
DORIS LEEPER SPRUCE CREEK PRESERVE
VOLUSIA COUNTY, FLORIDA

G - 19



Property Limits
state owned parcels

Source : Daytona, Samsula, Port Orange, and
New Smyrna Beach, FL Quadrangle map

Date : 08/16/10

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QUADRANGLE MAP DORIS LEEPER SPRUCE CREEK PRESERVE VOLUSIA COUNTY, FLORIDA

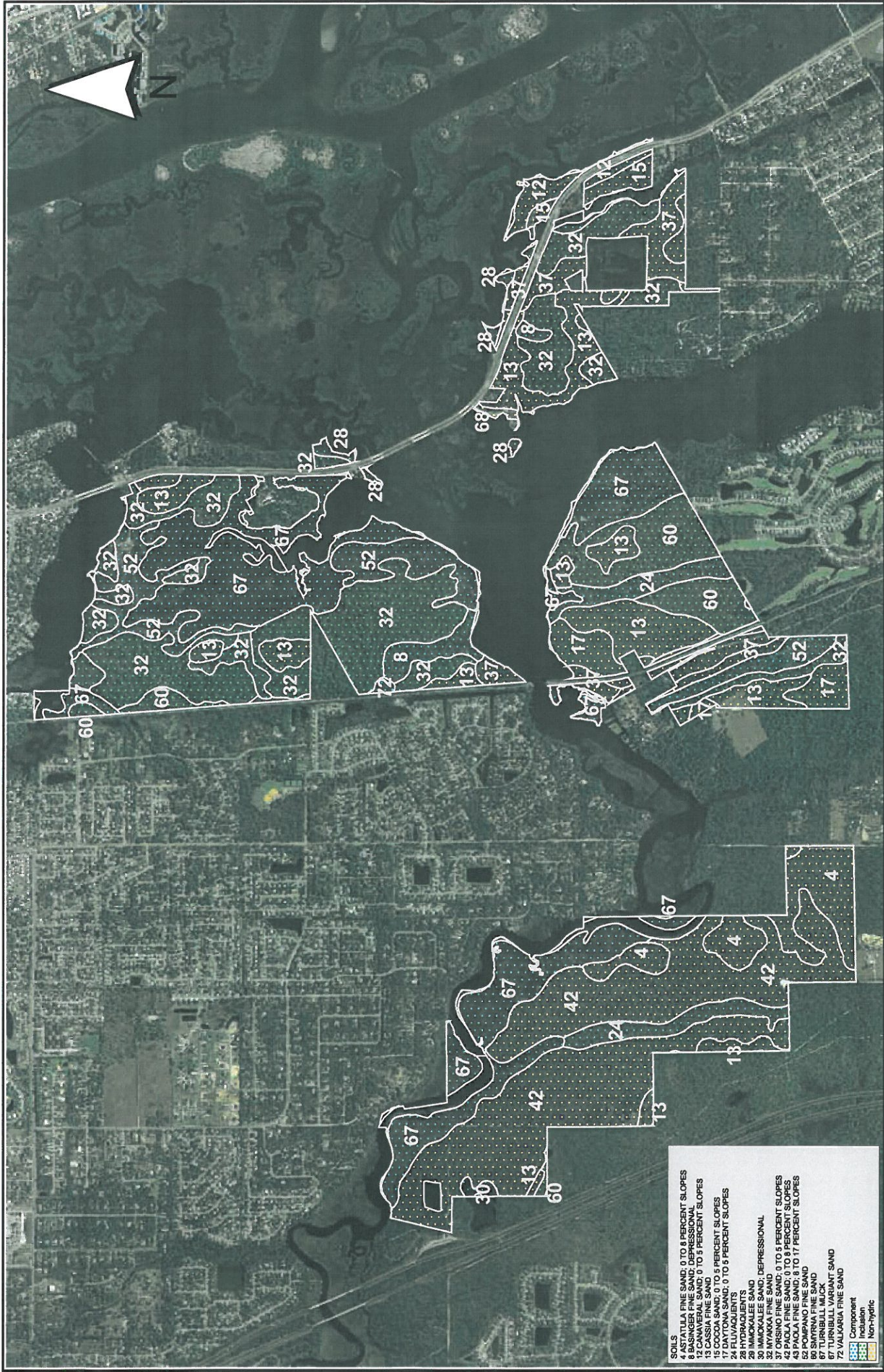
G - 20

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Civil Engineering • Landscape Architecture
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300 Interchange Boulevard
Ormond Beach, Florida 32174
ph 386 677-2482 • fx 386 677-2505

www.zevcohen.com



SOILS

4	ASTATULA FINE SAND; 0 TO 8 PERCENT SLOPES
8	BASINGER FINE SAND; DEPRESSIONAL
11	CLAYTON FINE SAND; 0 TO 5 PERCENT SLOPES
13	CASSIA FINE SAND
15	COCOA SAND; 0 TO 5 PERCENT SLOPES
17	DAYTONA SAND; 0 TO 5 PERCENT SLOPES
24	FLUVAQUENTS
28	HYDROQUENTS
30	IMOKALEE SAND; DEPRESSIONAL
32	MYAKKA FINE SAND
37	ORSINO FINE SAND; 0 TO 5 PERCENT SLOPES
42	PAOLA FINE SAND; 0 TO 8 PERCENT SLOPES
44	PAOLA FINE SAND; 0 TO 17 PERCENT SLOPES
52	POUNAWA FINE SAND
60	SATYRNA FINE SAND
67	TURNBULL MUCK
67	TURNBULL VARIANT SAND
72	VALCARGA FINE SAND

	Component
	Inclusion
	Non-hydric

Source : 2006 Volusia County True Color Aerials

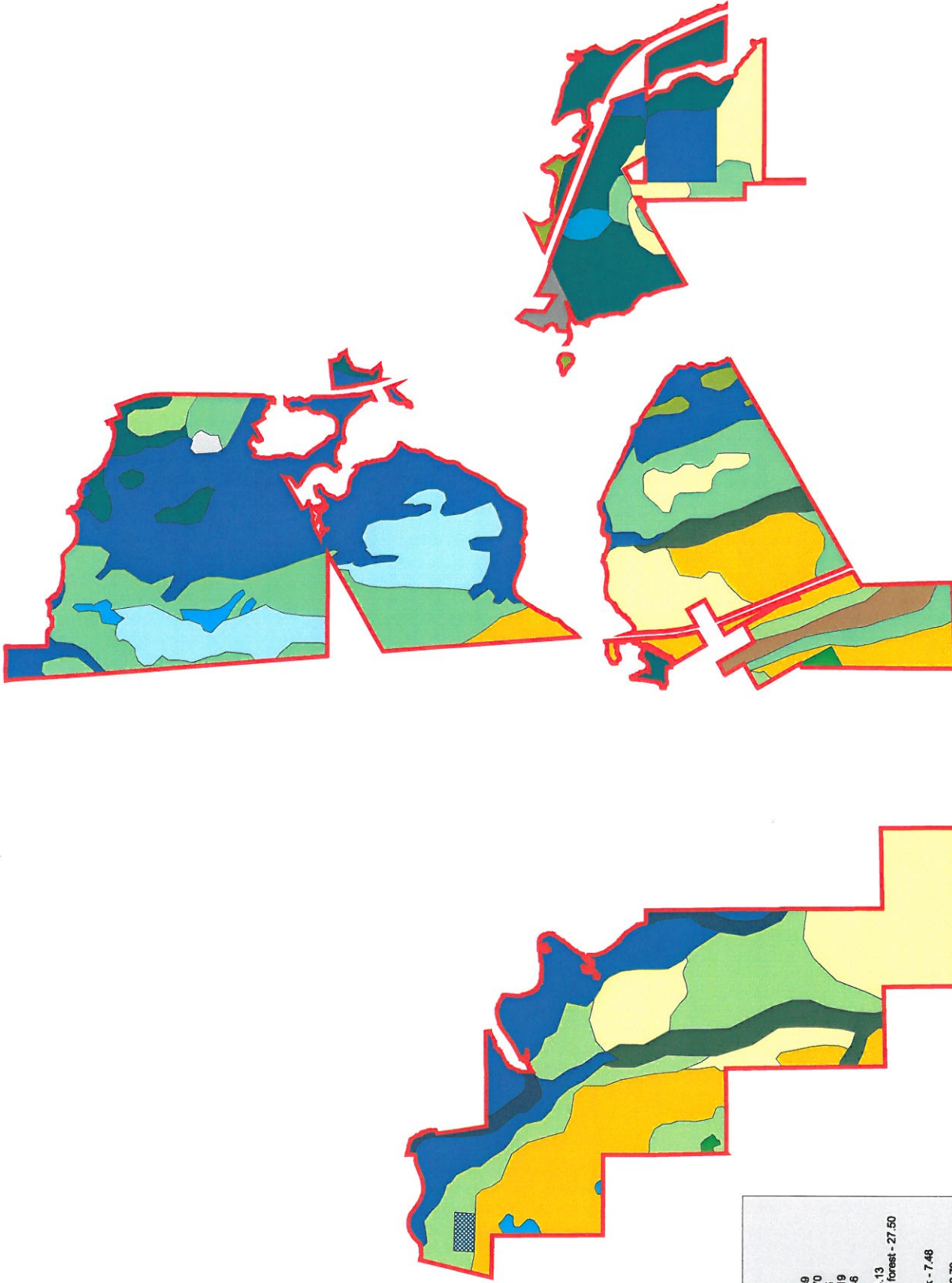
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SOILS MAP DORIS LEEPER SPRUCE CREEK PRESERVE VOLUSIA COUNTY, FLORIDA

G - 21



Property Limits	
	Habitats - Acres
	clearing - 3.44
	developed - 9.76
	marsh - 281.59
	marsh - 185.70
	improved pasture - 4.85
	mangrove swamp - 15.19
	bottomland forest - 65.46
	scrub - 280.04
	scrubby flatwoods - 254.13
	successional hardwood forest - 27.50
	wet flatwoods - 112.83
	wet prairie - 13.61
	coastal hydric hammock - 7.48
	salt marsh - 480.94
	maritime hammock - 182.79
	impoundment - 5.01
	blackwater stream - 21.89

Source :

Date : 08/16/10

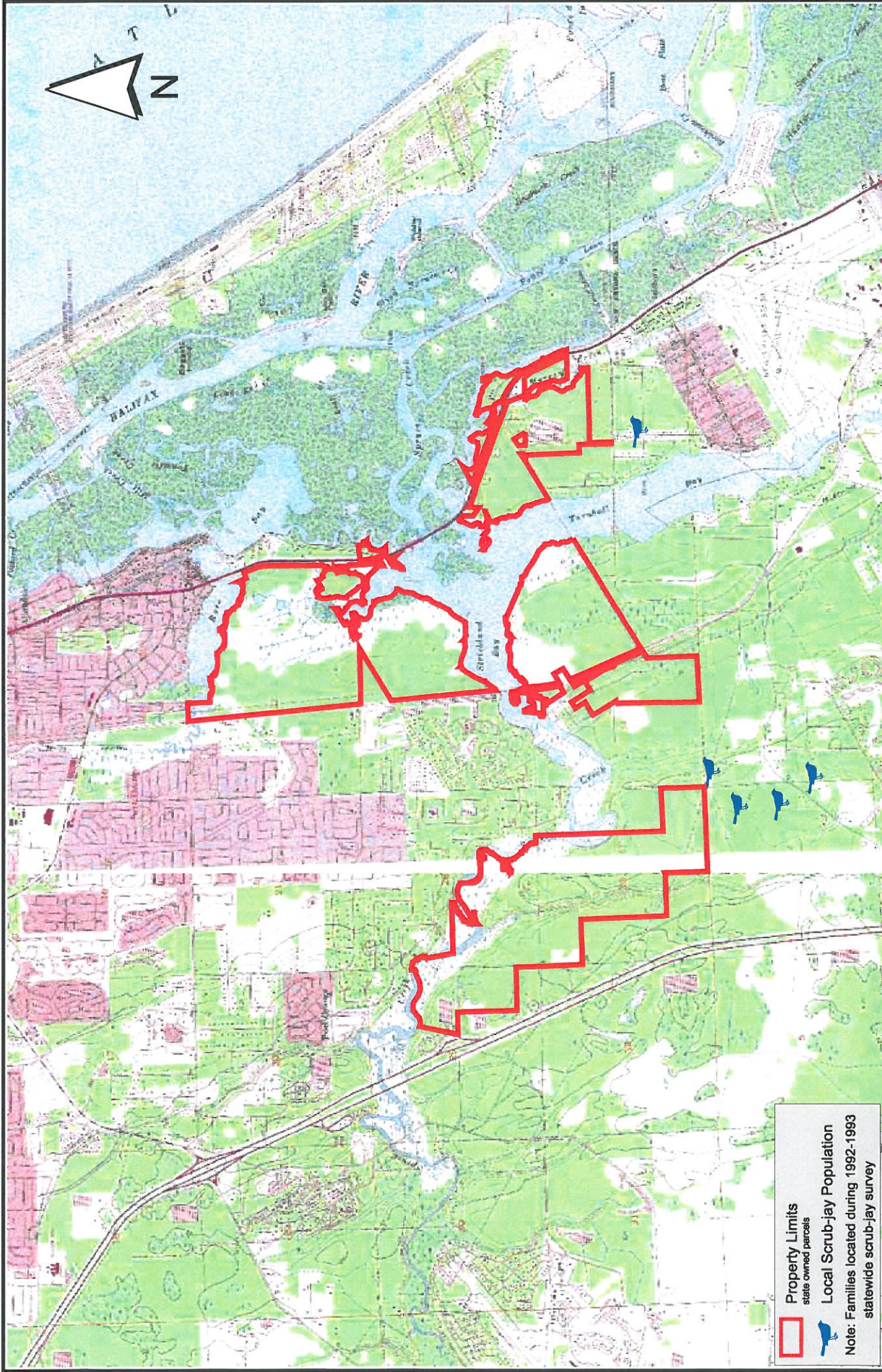
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2500 0 2500 Feet



HABITAT MAP DORIS LEEPER SPRUCE CREEK PRESERVE VOLUSIA COUNTY, FLORIDA

G - 22



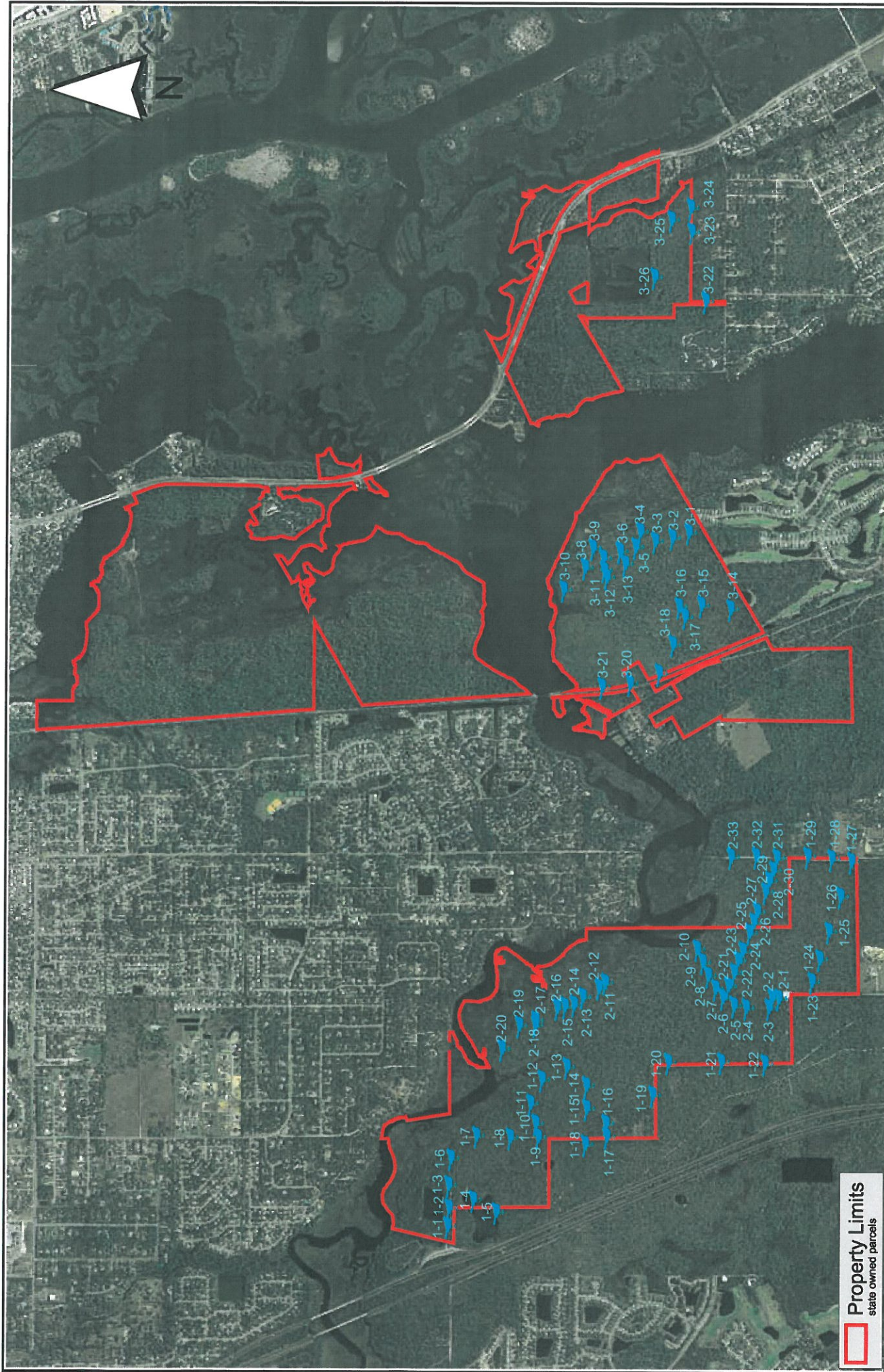
Property Limits
 state owned parcels
 Local Scrub-jay Population
 Note: Families located during 1992-1993
 statewide scrub-jay survey

Source : Daytona, Samsula, Port Orange, and
 New Smyrna Beach, FL Quadrangle map
 Date : 08/16/10
 Path : Z:/10041/lmp.apr

4000 0 4000 Feet

LOCAL SCRUB JAY FAMILY MAP DORIS LEEPER SPRUCE CREEK PRESERVE VOLUSIA COUNTY, FLORIDA

G - 23



Source : 2006 Volusia County True Color Aerials

Date : 08/16/10

Path : Z:/10041/Imp.apr

2500 0 2500 Feet

SCRUB JAY VOCALIZATION STATION MAP DORIS LEEPER SPRUCE CREEK PRESERVE VOLUSIA COUNTY, FLORIDA

G - 24

APPENDIX B

Wildlife Species Observed List

Fish and Wildlife

Wildlife observations, both direct and indirect (indirect observations of their presence include remnants, tracks, burrows, calls, scat, etc.), were made throughout the course of the site investigations. Pedestrian transects were traversed along existing field trails, as well as along vegetational community boundaries. Fish species identification was collected via 8 foot cast net throws and 50 foot seine net pulls. A list of species observed is provided in the following table:

Table 1: Wildlife species observed on the Doris Leeper Spruce Creek Preserve in Volusia County, Florida.

Taxon	Common Name	Scientific Name	Listed Species*
Reptiles/Amphibians			
	Green anole	<i>Anolis carolinensis</i>	No
	Five-lined skink	<i>Eumeces fasciatus</i>	No
	Southern toad	<i>Anaxyrus terrestris</i>	No
	Green tree frog	<i>Hyla cinerea</i>	No
	Southern black racer	<i>Coluber constrictor priapus</i>	No
	Florida box turtle	<i>Terrapene carolina bauri</i>	No
	Gopher tortoise	<i>Gopherus polyphemus</i>	Yes
	Florida softshell turtle	<i>Apalone ferox</i>	No
	American alligator	<i>Alligator mississippiensis</i>	Yes
Fish			
	Freshwater		
	Eastern mudminnow	<i>Umbra pygmaea</i>	No
	Mosquitofish	<i>Gambusia spp.</i>	No
	Bluegill	<i>Lepomis macrochirus</i>	No
	Warmouth	<i>Lepomis gulosus</i>	No
	Florida largemouth bass	<i>Micropterus salmoides floridanus</i>	No
	Longnose gar	<i>Lepisosteus osseus</i>	No
	Marine		
	Mud minnow	<i>Fundulus grandis</i>	No
	Yellowfin mojarra	<i>Gerres cinereus</i>	No
	Striped mojarra	<i>Eugerres plumieri</i>	No
	Bay anchovy	<i>Anchoa mitchilli</i>	No
	White mullet	<i>Mugil curema</i>	No
	Striped mullet	<i>Mugil cephalus</i>	No
	Atlantic needlefish	<i>Strongylura marina</i>	No
	Atlantic menhaden	<i>Brevoortia tyrannus</i>	No
	Gulf pipefish	<i>Syngnathus scovelli</i>	No
	Sheepshead	<i>Archosargus probatocephalus</i>	No
	Grey (Mangrove) snapper	<i>Lutjanus griseus</i>	No
	Summer flounder	<i>Paralichthys dentatus</i>	No
	Common snook	<i>Centropomus undecimalis</i>	No

Birds

Anhinga	<i>Anhinga anhinga</i>	No
Wood stork	<i>Mycteria americana</i>	Yes
Brown pelican	<i>Pelecanus occidentalis</i>	Yes
Osprey	<i>Pandion haliaetus</i>	Yes
Tricolored heron	<i>Egretta tricolor</i>	Yes
White ibis	<i>Eudocimus albus</i>	Yes
Cattle egret	<i>Bubulcus ibis</i>	No
Great blue heron	<i>Ardea herodias</i>	No
Great egret	<i>Ardea alba</i>	No
Belted kingfisher	<i>Ceryle alcyon</i>	No
Ruby-throated hummingbird	<i>Archilochus colubris</i>	No
Carolina chickadee	<i>Poecile carolinensis</i>	No
Carolina wren	<i>Thryothorus ludovicianus</i>	No
Grey catbird	<i>Dumetella carolinensis</i>	No
Downy woodpecker	<i>Picoides pubescens</i>	No
Pileated woodpecker	<i>Dryocopus pileatus</i>	No
Red bellied woodpecker	<i>Melanerpes carolinus</i>	No
Blue jay	<i>Cyanocitta cristata</i>	No
Florida scrub-jay	<i>Aphelocoma coerulescens</i>	Yes
Mockingbird	<i>Mimus polyglottos</i>	No
Loggerhead shrike	<i>Lanius ludovicianus</i>	No
Red-winged blackbird	<i>Agelaius phoeniceus</i>	No
Eastern towhee	<i>Pipilo erythrophthalmus</i>	No
Tufted titmouse	<i>Baeolophus bicolor</i>	No
White-eyed vireo	<i>Vireo griseus</i>	No
Brown thrasher	<i>Toxostoma rufum</i>	No
Northern cardinal	<i>Cardinalis cardinalis</i>	No
Common ground dove	<i>Columbina passerine</i>	No
Mourning dove	<i>Zenaida macroura</i>	No
Wild turkey	<i>Meleagris gallopavo</i>	No
American crow	<i>Corvus brachyrhynchos</i>	No
Boat-tailed grackle	<i>Quiscalus major</i>	No
Black vulture	<i>Coragyps atratus</i>	No
Red-shouldered hawk	<i>Buteo jamaicensis</i>	No
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Yes

Mammals

Nine-banded armadillo	<i>Dasypus novemcinctus</i>	No
Southeastern pocket gopher	<i>Geomys pinetis</i>	No
Raccoon	<i>Procyon lotor</i>	No
Bobcat	<i>Felis rufus</i>	No
Grey squirrel	<i>Sciurus carolinensis</i>	No
White-tailed deer	<i>Odocoileus virginianus</i>	No

USFWS Concurrence Letter



United States Department of the Interior

U. S. FISH AND WILDLIFE SERVICE

7915 BAYMEADOWS WAY, SUITE 200
JACKSONVILLE, FLORIDA 32256-7517

IN REPLY REFER TO:

41910-2011-TA-0087

December 13, 2010

Jody Sisk
Zev Cohen and Associates, Inc.
4475 US 1 South, Suite 601
St. Augustine, Florida 32086

RE: 41910-2011-TA-0087

Dear Mr. Sisk,

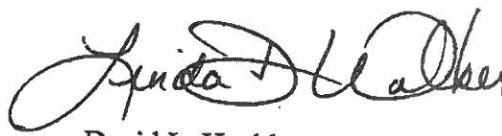
Thank you for your letter dated December 1, 2010, to the U.S. Fish and Wildlife Service (Service) regarding the Doris Leeper Spruce Creek Preserve property located along Spruce Creek from US1 to I-95 (Sections 25, 26, 35, and 36, Township 16 South, Range 33 East) in Volusia County, Florida. Scrub-jay surveys of the site were conducted on July 26-30, 2010, and information in the report reveals that no scrub-jays were observed on the property. One scrub-jay was reported to approach the southern boundary of the property during the survey, but it did not come into the property and flew back off-site heading south.

Based on the above information, the U.S. Fish and Wildlife Service concludes that at this time the parcel is not occupied by the Florida scrub-jay. The Doris Leeper Spruce Creek Preserve intends to manage the scrub habitat on the property according to details within the report. Managing these areas may allow the development of more appropriate habitat for scrub-jays in the future.

Note that the Service's determination in this letter is valid for a period of no more than two years from the date of this letter. If additional information in the future indicates that the property is being used by scrub-jays, please notify our office so that we can reassess our determination.

If you have any further questions please contact Erin Gawera at (904) 731-3121.

Sincerely,


David L. Hankla
for Field Supervisor

APPENDIX H:

Archaeological and Historical Resources

**Doris Leaper Spruce Creek Preserve
Florida Master Site File Listed Cultural Sites (State-owned lands)**

Site Name	FMSF ID	Site Type
<i>Brick Pile</i>	8VO5340	Bldg. remains, homestead
<i>Corduroy Causeway</i>	8VO5339	Artifact scatter, low density, historic wharf, road
<i>Crushed Coquina Causeway</i>	8VO5342	Historic road segment
<i>Doris Leaper Preserve Midden</i>	8VO7667	Land-terrestrial
<i>Lightbulb Dump</i>	8VO7073	Artifact scatter, historic refuse
<i>Moore Shell Midden</i>	8VO2851	Extractive site/prehistoric shell midden
<i>Odyssey Midden</i>	8VO7075	Prehistoric shell midden
<i>Sleepy Hollow Mound</i>	8VO7074	Prehistoric shell works, variable density
<i>Spring Ditch</i>	8VO7076	Historic well
<i>Spruce Creek Midden Complex</i>	8VO0239	Prehistoric shell midden
<i>Spruce Creek Mound Complex</i>	8VO99	Sand mound complex, canoe ramp
<i>Steinbach</i>	8VO3455	Artifact scatter, low density
<i>Stinging Nettle Mound</i>	8VO2579	Prehistoric mound and midden
<i>Stone Bridge</i>	8VO7202	Historic road segment/rice dike/dam

Note: *Nordmann's Mound* (8VO100) is located on State owned land, but the Florida Master Site File indicates it is destroyed.

**MANAGEMENT PROCEDURES FOR
ARCHAEOLOGICAL AND HISTORICAL SITES AND PROPERTIES
ON STATE - OWNED OR CONTROLLED LANDS**
(revised August, 1995)

A. GENERAL DISCUSSION

Archaeological and historic sites are defined collectively in 267.021(3), F.S., as "historic properties" or "historic resources". They have several essential characteristics which must be recognized in a management program.

First of all, they are a finite and non-renewable resource. Once destroyed, presently existing resources, including buildings, other structures, shipwreck remains, archaeological sites and other objects of antiquity, cannot be renewed or revived. Today, sites in the State of Florida are being destroyed by all kinds of land development, inappropriate land management practices, erosion, looting, and to a minor extent even by well-intentioned professional scientific research (e.g., archaeological excavation). Measures must be taken to ensure that some of these resources will be preserved for future study and appreciation.

Secondly, sites are unique because individually they represent the tangible remains of events which occurred at a specific time and place:

Thirdly, while sites uniquely reflect localized events, these events and the origin of particular sites are related to conditions and events in other times and places. Sites can be understood properly only in relation to their natural surroundings and the activities of inhabitants of other sites. Managers must be aware of this "systemic" character of historic and archaeological sites. Also, it should be recognized that archaeological sites are time capsules for more than cultural history; they preserve traces of past biotic communities, climate, and other elements of the environment that may be of interest to other scientific disciplines.

Finally, the significance of sites, particularly archaeological ones, derives not only from the individual artifacts within them, but equally from the spatial arrangement of those artifacts in both horizontal and vertical planes. When archaeologists excavate, they recover, not merely objects, but also a record of the positions of these objects in relation to one another and their containing matrix (e.g., soil strata). Much information is sacrificed if the so-called "context" of archaeological objects is destroyed or not recovered, and this is what archaeologists are most concerned about when a site is threatened with destruction or damage. The artifacts themselves can be recovered even after a site is heavily disturbed, but the context - the vertical and horizontal relationships - cannot. Historic structures also contain a wealth of cultural (socio-economic) data which can be lost if historically sensitive maintenance, restoration or rehabilitation procedures are not implemented, or if they are demolished or extensively altered without appropriate documentation. Lastly, it should not be forgotten that historic structures often have associated potentially significant historic archaeological features which must be considered in land management decisions.

B. STATUTORY AUTHORITY

Chapter 253, Florida Statutes ("State Lands") directs the preparation of "single-use" or "multiple-use" land management plans for all state-owned lands and state-owned sovereignty submerged lands. In this document, 253.034(4), F.S., specifically requires that "all management plans, whether for single-use or multiple-use properties, shall specifically describe how the managing agency plans to identify, locate, protect and preserve, or otherwise use fragile non-renewable resources, such as archaeological and historic sites, as well as other fragile resources..."

Chapter 267, Florida Statutes is the primary historic preservation authority of the state. The importance of protecting and interpreting archaeological and historic sites is recognized in 267.061(1)(a), F.S.:

The rich and unique heritage of historic properties in this state, representing more than 10,000 years of human presence, is an important legacy to be valued and conserved for present and future generations. The destruction of these nonrenewable historic resources will engender a significant loss to the state's quality of life, economy, and cultural environment. It is therefore declared to be state policy to:

1. Provide leadership in the preservation of the state's historic resources; [and]
2. Administer state-owned or state-controlled historic resources in a spirit of stewardship and trusteeship;...

Responsibilities of the Division of Historical Resources in the Department of State, pursuant to 267.061(3), F.S., include the following:

1. Cooperate with federal and state agencies, local governments, and private organizations and individuals to direct and conduct a comprehensive statewide survey of historic resources and to maintain an inventory of such responses.
2. Develop a comprehensive statewide historic preservation plan.
3. Identify and nominate eligible properties to the *National Register of Historic Places* and otherwise administer applications for listing properties in the National Register of Historic Places.
4. Cooperate with federal and state agencies, local governments, and organizations and individuals to ensure that historic resources are taken into consideration at all levels of planning and development.
5. Advise and assist, as appropriate, federal and state agencies and local governments in carrying out their historic preservation responsibilities and programs.
6. Carry out on behalf of the state the programs of the National Historic Preservation Act of 1966, as amended, and to establish, maintain, and administer a state historic

preservation program meeting the requirements of an approved program and fulfilling the responsibilities of state historic preservation programs as provided in subsection 101(b) of that act.

7. Take such other actions necessary or appropriate to locate, acquire, protect, preserve, operate, interpret, and promote the location, acquisition, protection, preservation, operation, and interpretation of historic resources to foster an appreciation of Florida history and culture. Prior to the acquisition, preservation, interpretation, or operation of a historic property by a state agency, the Division shall be provided a reasonable opportunity to review and comment on the proposed undertaking and shall determine that there exists historic authenticity and a feasible means of providing for the preservation, interpretation and operation of such property.
8. Establish professional standards for the preservation, exclusive of acquisition, of historic resources in state ownership or control.
9. Establish guidelines for state agency responsibilities under subsection (2).

Responsibilities of other state agencies of the executive branch, pursuant to 267.061(2), F.S., include:

1. Each state agency of the executive branch having direct or indirect jurisdiction over a proposed state or state-assisted undertaking shall, in accordance with state policy and prior to the approval of expenditure of any state funds on the undertaking, consider the effect of the undertaking on any historic property that is included in, or eligible for inclusion in, the *National Register of Historic Places*. Each such agency shall afford the division a reasonable opportunity to comment with regard to such an undertaking.
2. Each state agency of the executive branch shall initiate measures in consultation with the division to assure that where, as a result of state action or assistance carried out by such agency, a historic property is to be demolished or substantially altered in a way which adversely affects the character, form, integrity, or other qualities which contribute to [the] historical, architectural, or archaeological value of the property, timely steps are taken to determine that no feasible and prudent alternative to the proposed demolition or alteration exists, and, where no such alternative is determined to exist, to assure that timely steps are taken either to avoid or mitigate the adverse effects, or to undertake an appropriate archaeological salvage excavation or other recovery action to document the property as it existed prior to demolition or alteration.
3. In consultation with the division [of Historical Resources], each state agency of the executive branch shall establish a program to locate, inventory, and evaluate all historic properties under the agency's ownership or control that appear to qualify for the National Register. Each such agency shall exercise caution to assure that any such historic property is not inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate significantly.

4. Each state agency of the executive branch shall assume responsibility for the preservation of historic resources which are owned or controlled by such agency. Prior to acquiring, constructing, or leasing buildings for the purpose of carrying out agency responsibilities, the agency shall use, to the maximum extent feasible, historic properties available to the agency. Each agency shall undertake, consistent with preservation of such properties, the mission of the agency, and the professional standards established pursuant to paragraph (3)(k), any preservation actions necessary to carry out the intent of this paragraph.
5. Each state agency of the executive branch, in seeking to acquire additional space through new construction or lease, shall give preference to the acquisition or use of historic properties when such acquisition or use is determined to be feasible and prudent compared with available alternatives. The acquisition or use of historic properties is considered feasible and prudent if the cost of purchase or lease, the cost of rehabilitation, remodeling, or altering the building to meet compliance standards and the agency's needs, and the projected costs of maintaining the building and providing utilities and other services is less than or equal to the same costs for available alternatives. The agency shall request the division to assist in determining if the acquisition or use of a historic property is feasible and prudent. Within 60 days after making a determination that additional space is needed, the agency shall request the division to assist in identifying buildings within the appropriate geographic area that are historic properties suitable for acquisition or lease by the agency, whether or not such properties are in need of repair, alteration, or addition.
6. Consistent with the agency's mission and authority, all state agencies of the executive branch shall carry out agency programs and projects, including those under which any state assistance is provided, in a manner which is generally sensitive to the preservation of historic properties and shall give consideration to programs and projects which will further the purposes of this section.

Section 267.12 authorizes the Division to establish procedures for the granting of research permits for archaeological and historic site survey or excavation on state-owned or controlled lands, while Section 267.13 establishes penalties for the conduct of such work without first obtaining written permission from the Division of Historical Resources. The Rules of the Department of State, Division of Historical Resources, for research permits for archaeological sites of significance are contained in Chapter 1A-32, F.A.C.

Another Florida Statute affecting land management decisions is Chapter 872, F.S. Section 872.02, F.S., pertains to marked grave sites, regardless of age. Many state-owned properties contain old family and other cemeteries with tombstones, crypts, etc. Section 872.05, F.S., pertains to unmarked human burial sites, including prehistoric and historic Indian burial sites. Unauthorized disturbance of both marked and unmarked human burial sites is a felony.

C. MANAGEMENT POLICY

The choice of a management policy for archaeological and historic sites within state-owned or controlled lands obviously depends upon a detailed evaluation of the characteristics and conditions of the individual sites and groups of sites within those tracts. This includes an interpretation of the significance (or potential significance) of these sites, in terms of social and political factors, as well as environmental factors. Furthermore, for historic structures architectural significance must be considered, as well as any associated historic landscapes.

Sites on privately owned lands are especially vulnerable to destruction, since often times the economic incentives for preservation are low compared to other uses of the land areas involved. Hence, sites in public ownership have a magnified importance, since they are the ones with the best chance of survival over the long run. This is particularly true of sites which are state-owned or controlled, where the basis of management is to provide for land uses that are minimally destructive of resource values."

It should be noted that while many archaeological and historical sites are already recorded within state-owned or controlled-lands, the majority of the uplands areas and nearly all of the inundated areas have not been surveyed to locate and assess the significance of such resources. The known sites are, thus, only an incomplete sample of the actual resources - i.e., the number, density, distribution, age, character and condition of archaeological and historic sites - on these tracts. Unfortunately, the lack of specific knowledge of the actual resources prevents formulation of any sort of detailed management or use plan involving decisions about the relative historic value of individual sites. For this reason, a generalized policy of conservation is recommended until the resources have been better addressed.

The generalized management policy recommended by the Division of Historical Resources includes the following:

1. State land managers shall coordinate all planned activities involving known archaeological or historic sites or potential site areas closely with the Division of Historical Resources in order to prevent any kind of disturbance to significant archaeological or historic sites that may exist on the tract. Under 267.061(1)(b), F.S., the Division of Historical Resources is vested with title to archaeological and historic resources abandoned on state lands and is responsible for administration and protection of such resources. The Division will cooperate with the land manager in the management of these resources. Furthermore, provisions of 267.061(2) and 267.13, F.S., combined with those in 267.061(3) and 253.034(4), F.S., require that other managing (or permitting) agencies coordinate their plans with the Division of Historical Resources at a sufficiently early stage to preclude inadvertent damage or destruction to known or potentially occurring, presently unknown archaeological and historic sites. The provisions pertaining to human burial sites must also be followed by state land managers when such remains are known or suspected to be present (see 872.02 and 872.05, F.S., and 1A-44, F.A.C.)

2. Since the actual resources are so poorly known, the potential impact of the managing agency's activities on historic archaeological sites may not be immediately apparent. Special field survey for such sites may be required to identify the potential endangerment as a result of particular management or permitting activities. The Division may perform surveys, as its resources permit, to aid the planning of other state agencies in their management activities, but outside archaeological consultants may have to be retained by the managing agency. This would be especially necessary in the cases of activities contemplating ground disturbance over large areas and unexpected occurrences. It should be noted, however, that in most instances Division staff's knowledge of known and expected site distribution is such that actual field surveys may not be necessary, and the project may be reviewed by submitting a project location map (preferably a 7.5 minute U.S.G.S. Quadrangle map or portion thereof) and project descriptive data, including detailed construction plans. To avoid delays, Division staff should be contacted to discuss specific project documentation review needs.
3. In the case of known significant sites, which may be affected by proposed project activities, the managing agency will generally be expected to alter proposed management or development plans, as necessary, or else make special provisions to minimize or mitigate damage to such sites.
4. If in the course of management activities, or as a result of development or the permitting of dredge activities (see 403.918(2)(6)a, F.S.), it is determined that valuable historic or archaeological sites will be damaged or destroyed, the Division reserves the right, pursuant to 267.061(1)(b), F.S., to require salvage measures to mitigate the destructive impact of such activities to such sites. Such salvage measures would be accomplished before the Division would grant permission for destruction of the affected site areas. The funding needed to implement salvage measures would be the responsibility of the managing agency planning the site destructive activity. Mitigation of historic structures at a minimum involves the preparation of measured drawings and documentary photographs. Mitigation of archaeological resources involves the excavation, analysis and reporting of the project findings and must be planned to occur sufficiently in advance to avoid project construction delays. If these services are to be contracted by the state agency, the selected consultant will need to obtain an Archaeological Research Permit from the Division of Historical Resources, Bureau of Archaeological Research (see 267.12, F.S. and Rules 1A-32 and 1A-46 F.A.C.).
5. For the near future, excavation of non-endangered (i.e., sites not being lost to erosion or development) archaeological sites is discouraged. There are many endangered sites in Florida (on both private and public lands) in need of excavation because of the threat of development or other factors. Those within state-owned or controlled lands should be left undisturbed for the present - with particular attention devoted to preventing site looting by "treasure hunters". On the other hand, the archaeological and historic survey of these tracts is encouraged in order to build an inventory of the resources present, and to assess their scientific research potential and historic or architectural significance.
6. The cooperation of land managers in reporting sites to the Division that their field personnel may discover is encouraged. The Division will help inform field personnel from other

resource managing agencies about the characteristics and appearance of sites. The Division has initiated a cultural resource management training program to help accomplish this. Upon request the Division will also provide to other agencies archaeological and historical summaries of the known and potentially occurring resources so that information may be incorporated into management plans and public awareness programs (See Management Implementation).

7. Any discovery of instances of looting or unauthorized destruction of sites must be reported to the agent for the Board of Trustees of the Internal Improvement Trust Fund and the Division so that appropriate action may be initiated. When human burial sites are involved, the provisions of 872.02 and 872.05, F. S. and Rule 1A-44, F.A.C., as applicable, must also be followed. Any state agent with law enforcement authority observing individuals or groups clearly and incontrovertibly vandalizing, looting or destroying archaeological or historic sites within state-owned or controlled lands without demonstrable permission from the Division will make arrests and detain those individuals or groups under the provisions of 267.13, 901.15, and 901.21, F.S., and related statutory authority pertaining to such illegal activities on state-owned or controlled lands. County Sheriffs' officers are urged to assist in efforts to stop and/or prevent site looting and destruction.

In addition to the above management policy for archaeological and historic sites on state-owned land, special attention shall be given to those properties listed in the *National Register of Historic Places* and other significant buildings. The Division recommends that the *Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings* (Revised 1990) be followed for such sites.

The following general standards apply to all treatments undertaken on historically significant properties.

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.
2. The historic character of a property shall be retained and preserved. The removal of historic materials or alterations of features and spaces that characterize a property shall be avoided.
3. Each property shall be recognized as a physical record of its time, place and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.
4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved.

6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.
7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.
8. Significant archaeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
9. New additions, exterior alterations, or related new construction shall not destroy materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired. (see *Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings* [Revised 1990]).

Division of Historical Resources staff is available for technical assistance for any of the above listed topics. It is encouraged that such assistance be sought as early as possible in the project planning.

D. MANAGEMENT IMPLEMENTATION

As noted earlier, 253.034(4), F.S., states that "all management plans, whether for single-use or multiple-use properties, shall specifically describe how the managing agency plans to identify, locate, protect and preserve, or otherwise use fragile non-renewable resources, such as archaeological and historic sites..." The following guidelines should help to fulfill that requirement.

1. All land managing agencies should contact the Division and send U.S.G.S. 7.5 minute quadrangle maps outlining the boundaries of their various properties.
2. The Division will in turn identify site locations on those maps and provide descriptions for known archaeological and historical sites to the managing agency.
3. Further, the Division may also identify on the maps areas of high archaeological and historic site location probability within the subject tract. These are only probability zones, and sites

may be found outside of these areas. Therefore, actual ground inspections of project areas may still be necessary.

4. The Division will send archaeological field recording forms and historic structure field recording forms to representatives of the agency to facilitate the recording of information on such resources.
5. Land managers will update information on recorded sites and properties.
6. Land managers will supply the Division with new information as it becomes available on previously unrecorded sites that their staff locate. The following details the kind of information the Division wishes to obtain for any new sites or structures which the land managers may report:

A. Historic Sites

- (1) Type of structure (dwelling, church, factory, etc.).
- (2) Known or estimated age or construction date for each structure and addition.
- (3) Location of building (identify location on a map of the property, and building placement, i.e., detached, row, etc.).
- (4) General Characteristics: (include photographs if possible) overall shape of plan (rectangle, "L" "T" "H" "U", etc.); number of stories; number of vertical divisions of bays; construction materials (brick, frame, stone, etc.); wall finish (kind of bond, coursing, shingle, etc.); roof shape.
- (5) Specific features including location, number and appearance of:
 - (a) Important decorative elements;
 - (b) Interior features contributing to the character of the building;
 - (c) Number, type, and location of outbuildings, as well as date(s) of construction;
 - (d) Notation if property has been moved;
 - (e) Notation of known alterations to building.

B. Archaeological Sites

- (1) Site location (written narrative and mapped location).
- (2) Cultural affiliation and period.
- (3) Site type (midden, burial mound, artifact scatter, building rubble, etc.).
- (4) Threats to site (deterioration, vandalism, etc.).

- (5) Site size (acreage, square meters, etc.).
- (6) Artifacts observed on ground surface (pottery, bone, glass, etc.).
- (7) Description of surrounding environment.
7. No land disturbing activities should be undertaken in areas of known archaeological or historic sites or areas of high site probability without prior review by the Division early in the project planning.
8. Ground-disturbing activities may proceed elsewhere but land managers should stop disturbance in the immediate vicinity of artifact finds and notify the Division if previously unknown archaeological or historic remains are uncovered. The provisions of Chapter 872, F.S., must be followed when human remains are encountered.
9. Excavation and collection of archaeological and historic sites on state lands without a permit from the Division is a violation of state law and shall be reported to a law enforcement officer. The use of metal detectors to search for historic artifacts shall be prohibited on state lands except when authorized in a 1A-32, F.A.C., research permit from the Division.
10. Interpretation and visitation which will increase public understanding and enjoyment of archaeological and historic sites without site destruction or vandalism is strongly encouraged.
11. Development of interpretive programs including trails, signage, kiosks, and exhibits is encouraged and should be coordinated with the Division.
12. Artifacts found or collected on state lands are by law the property of the Division. Land managers shall contact the Division whenever such material is found so that arrangements may be made for recording and conservation. This material, if taken to Tallahassee, can be returned for public display on a long-term loan.

E. ADMINISTERING AGENCY

Questions relating to the treatment of archaeological and historic resources on state lands may be directed to:

Compliance Review Section
Bureau of Historic Preservation
Division of Historical Resources
R.A. Gray Building
500 South Bronough Street
Tallahassee, Florida 32399-0250

Contact Person: Susan M. Harp
Historic Preservation Planner

Telephone (850) 487-2333
Suncom 277-2333
FAX (850) 922-0496

APPENDIX I:
Prescribed Burn Plan

INTRODUCTION

Fires, naturally occurring or man-induced, are an integral part of the ecology of the southern pine (*Pinus* spp.) region (Miller 1963) and have maintained fire-dependent plant communities in the southeast for countless years. Exclusion of fire reduces nutrient cycling and changes the vegetative community from an open canopy system to a closed one. The growth of dense brush shades out fire-dependent plants, including listed species, and has an adverse affect on fire-dependent wildlife such as Florida scrub-jays, and gopher tortoises. Exclusion of fires allows seral stages to increase until a climax hardwood community exists. Areas covered by dense brush lose much of their value to wildlife. For example, food and browse plants are less palatable, access is restricted and predator's ability to capture prey is hampered. Additionally, heavy fuel accumulation results in increased wildfire hazard. Prescribed burning is used extensively in forestry and wildlife management for fuel reduction, brush control, disease and insect control, site preparation and wildlife habitat improvement. It is a recommended tool for management of such game animals as white-tailed deer (*Odocoileus virginianus*), bobwhite quail (*Colinus virginianus*), mourning dove (*Zenaida macroura*) and wild turkey (*Meleagris gallopavo*) (U. S. Forest Service 1969, Stoddard 1971). The value of prescribed fire to these and other animals, such as raptors and some songbirds, are well documented (Givens 1962, Miller 1963, Stoddard 1963). Prescribed fire benefits wildlife by reducing underbrush density, thus improving access, promoting the growth of succulent vegetation and lowering browse to feeding height of deer. Additionally, it benefits aesthetic values and enhances growth and fruiting of important wildlife food plants, such as dewberries (*Rubus* spp.) and blueberries (*Vaccinium* spp.) (Halls 1977), as well as important community plants such as wiregrass (*Aristida stricta* var. *beyrichiana*).

BURN OBJECTIVES

Prescribed fire will be used on Doris Leeper Spruce Creek Preserve (DLSCP) as a habitat management tool in conjunction with other management techniques to accomplish a variety of objectives. The primary objective for using prescribed fire on the DLSCP is to restore and /or maintain fire-dependent native habitat communities. This will result in preserving native plant communities while simultaneously improving wildlife habitat. The benefits that will be derived from prescribed burning on the DLSCP include the long term preservation of native plant communities and improved wildlife habitat and numerous others as well:

Table 1. Objectives of the Doris Leeper Spruce Creek Preserve Prescribed Fire Plan, November, 2010.

- 1 Restore and /or maintain fire-dependent native habitat communities
- 2 Reduce fuel loads, to prevent or mitigate effects of wildfires.
- 3 (Re)introduce natural fire regime, growing season burns
- 4 Enhance aesthetics by controlling undesirable vegetation.
- 5 Promote succession of longleaf pine in flatwoods communities

- 6 Reduce biomass in shrub and canopy layers
- 7 Increase herbaceous species cover
- 8 Identify habitats requiring mechanical or other fire surrogate treatments prior to application of prescribed fire
- 9 Identify by habitat and location, appropriate fire-surrogate and other required pre-burn activities
- 10 Identify by habitat and location, areas where pre-treatment activities are required prior to conducting a prescribed burn
- 11 Control competing vegetation, forest diseases and insects
- 12 Improve forage for wildlife;
- 13 Remove dead materials and return nutrients to soils;
- 14 Reduce oak / xeric shrub biomass in the scrub community
- 15 Establish target fire return intervals for onsite communities
- 16 Create/ increase open patches, especially in the scrub
- 17 Identify areas / habitats where shrub layer is overgrown or excessive fuel loads exist
- 18 Introduce fire in varying seasonality, intensity and return intervals to promote pyrodiversity
- 19 Evaluate utilization of wildfires as a natural, controlled burn, on a case by case basis

DESCRIPTION OF AREA

DLSCP lies within three (3) local jurisdictions that include the City of Port Orange, the City of New Smyrna Beach, and unincorporated Volusia County. It generally bordered on the north by Spruce Creek and Rose Bay, on the west by public lands along Interstate 95 on the south by developed and undeveloped private residential lands, and on the east by US Hwy 1, although some parcels do occur east of US 1. Several city and county owned forested properties are contiguous to and abut the DLSCP on several of its boundaries. The Preserve consists of tracts separated by Spruce Creek, Strickland Bay, Turnbull Bay, Murray Creek and US 1. For communication purposes, these tracts are referred to by individual name as shown on the Parcel Identification Map. DLSCP is 1,921.3 acres in size and is comprised of the following habitats. Approximately 780 acres of the Preserve are proposed to be treated with prescribed fire. This number is less than the total acreage of habitat that is considered fire dependent. The reason is that are several areas that are located in an area that make fire logistically not feasible. This is discussed by habitat in this plan, and shown on the Burn Unit Map.

Rx Fire Comm.	Acres
Scrub	280.0
Scrubby FW	254.1
Mesic FW	281.6
Wet FW	112.8
Wet Prairie	13.6
Total Acres	942.1
Burn Unit Acres:	778.8

Natural Community Descriptions:

Mesic Hammock – Mesic hammocks are well developed hardwood and/or palm forests on rarely inundated soils. The canopy is typically closed and dominated by live oak (*Quercus virginiana*), cabbage palm (*Sabal palmetto*), southern magnolia (*Magnolia grandiflora*), and pignut hickory (*Carya glabra*). The mesic hammocks found at the Preserve are dominated by the canopy trees mentioned above and the canopy is closed. The understory consists of saw palmetto (*Serenoa repens*), American beautyberry (*Callicarpa americana*), gallberry (*Ilex glabra*), sparkleberry (*Vaccinium arboreum*), yaupon holly (*Ilex vomitoria*) and wax myrtle (*Myrica cerifera*).

Mesic hammocks are not considered fire-adapted communities and their structure and composition generally exclude fire encroachment. Fire will be utilized in adjacent communities to remove high levels of fuels and prevent catastrophic fires from encroaching into the hammocks.

However, the mesic hammocks located on the Martin's Dairy tract that are located between bluffs bordering the bottomland forest / creek system and Spruce Creek may have been former xeric hammocks or scrub. These areas are within natural fire shadows and have trended towards a mesic setting in their current condition. Based on the underlying soil map unit (42, Paola fine sand) these areas would typically be more xeric in appearance and vegetational composition. Soils within these specific hammocks indicate an intermediate condition of these two communities (xeric vs. mesic). Void of natural processes such as fire, xeric hammocks drift towards mesic hammocks. As the canopy closes, large canopy oaks become resistant to fire, hardwoods like southern magnolia encroach, and the growing layer of leaf litter increases organics and covers open sand patches associated with xeric hammocks. Evidence of some hammock in these areas is visible on the 1943 aerials.

Based on these conditions, portions of the mesic hammock on the Martin's Dairy tract may be targeted for timber harvest and scrub restoration. This would be targeted only to those areas above the bluffs along either creek system and would occur along borders adjacent to scrub restoration areas. At this time, no fire interval or prescribed burning is proposed within the hammocks. As scrub restoration approaches the edges of mesic hammocks described above, portions may be targeted for restoration. These areas would be monitored during successive years to determine if scrub conditions begin to appear or if secondary successional forest begins to appear. These observations will guide whether additional active management occurs in these zones.

Scrub – The Scrub is a community composed of evergreen shrubs, with or without a canopy of pines, and is found on dry, infertile, sandy ridges.

Scrub within the Preserve is dominated by myrtle oak (*Quercus myrtifolia*), sand live oak (*Quercus geminata*), Chapman's oak (*Quercus chapmanii*), and rusty lyonia (*Lyonia ferruginea*) within the shrub and subcanopy strata. There are a few remnant stands of sand

pine (*Pinus clausa*) in the canopy, but these appear to be declining in abundance. The oaks form a dense cover interspersed with few patchy openings that consist of bare sand with a sparse cover of herbs, particularly threeawns (*Aristida* spp.), hairsedges (*Bulbostylis* spp.), sandyfield beaksedge (*Rhynchospora megalocarpa*), pinweeds (*Lechea* spp.), and ground lichens (*Cladonia* spp.). Saw palmetto (*Serenoa repens*) is common but not dominant within the scrub.

While scrub is a fire-maintained community, it is not easily ignited. Scrub is thought to have burned less frequently than communities with a more easily ignited grassy groundcover, such as sandhill or mesic flatwoods. Scrub oak dominated scrub, as found within the Preserve, likely burned naturally at intervals between 5 and 20 years (based on the habitat requirements of the Florida scrub-jay). Oak height is a critical limiting factor for Florida scrub-jays which have been documented to abandon territories where the oaks reached >3 meters. A minimum five year fire return interval appears to be the time required for re-sprouting oak stems to reach acorn-bearing height, an important food source for jays.

Growth rates of scrub oaks are related to burn history and environmental conditions onsite. Long unburned oak scrub, which is found on the Preserve, may attain heights unsuitable for scrub-jays up to 50 percent faster after fire than regularly burned oak scrub and thus may at first require shorter burn intervals to maintain optimum heights following restoration of burning. In addition, small openings, needed by Florida scrub-jays for caching acorns, may need to be artificially restored in long unburned scrub by piling up fuel to create hotspots that kill the roots of the oaks.

The status of the scrub is primarily not suitable for burning in its current condition. This habitat will require mechanical or other fire surrogate activities prior to re-introduction of fire. Mechanical thinning, silviculture operations to harvest merchantable woods (limited here, but rusty *Lyonia* does have a local market), and forestry mowing will be implemented prior to burning. Following fuel reduction through fire surrogate activities, fire will be implemented in small tracts, from 10 – 25 acres at a time. The initial fire return interval for the DLSCP scrub will be 5-7 years. Following several seasons of fire implementation, this fire interval should be re-evaluated, and likely increased. When fire is not logistically possible, fire surrogate activities will be implemented once a burn unit is more than one year beyond the desired fire return interval.

Wet Flatwoods – Wet flatwoods are pine forests with a sparse or absent midstory and a dense groundcover of hydrophytic grasses, herbs, and low shrubs.

The canopy of the wet flatwoods within the Preserve consists of slash pine (*Pinus elliottii*) and pond pine (*P. serotina*), with the latter being the dominant species. The subcanopy consists of loblolly bay (*Gordonia lasianthus*), swamp bay (*Persea palustris*), dahoon holly (*Ilex cassine*), and wax myrtle. The shrub layer is dominated by gallberry (*Ilex glabra*), shiny lyonia (*Lyonia lucida*), and saw palmetto (*Serenoa repens*). This habitat has been long unburned and saw palmetto forms a dense thicket. The herbaceous species are found primarily in breaks in the shrub layer, along field roads or game trails and consists of wiregrass (*Aristida stricta*), blue maidencane (*Amphicarpum muhlenbergianum*), Carolina

redroot (*Lachnanthes carolina*), beaksedges (*Rhynchospora* spp.), and maidencane (*Panicum hemitomon*). Due to this site being fire suppressed the shrub layer is more abundant compared to the herbs.

Wet flatwoods tend to have a longer fire interval than upland pine flatwoods in the order of 5 to 7 years. If the interval is too long, 7 to 10 years, it can lead to an increase in woody species cover and a decline in grasses and forb cover (or palmetto cover, as evidenced in this habitat on DLSCP). Many factors other than frequency of fire, such as season of fire, pre- and post-fire soil moistures, groundwater levels, weather, plant size or age at the time of fire, can greatly influence tree mortality and vegetation response to fire. Fire in the growing season can reduce the stature of woody vegetation, particularly hardwoods, prevent increases in shrub densities, and promote flowering of herbaceous groundcover.

This habitat will require mechanical fuel reduction through forestry mowing or similar techniques. Canopy thinning and harvest is recommended, however, due to difficulty of access, is not likely to occur. Once mechanical fuel reduction has occurred, the site will be burned repetitively in winter months to further reduce palmetto and shrub layer coverage. Once the fuel loads are deemed appropriate, growing season fire will be implemented on a 4-7 year fire return interval. When fire is not logistically possible, fire surrogate activities will be implemented once a burn unit is more than one year beyond the desired fire return interval.

Mesic Flatwoods – Mesic flatwoods are generally characterized by an open canopy of tall pines and dense ground cover including shrubs, grasses, and forbs. Historically this community's canopy was dominated by longleaf pine (*Pinus palustris*). Today the majority of mesic flatwoods found throughout central and northeastern Florida are dominated by dense stands of slash pine due to the pine silviculture industry and furthermore by prolonged periods of fire exclusion.

The canopy found within the mesic flatwoods of the Preserve is comprised primarily of slash pine, however, longleaf pine does occur throughout much of this habitat on DLSCP. The ground cover is dominated by a heavy cover of saw palmetto and gallberry. In its natural state, mesic flatwoods herbaceous cover is dominated by wiregrass, dropseeds (*Sporobolus* spp.), panicgrasses (*Dichanthelium* spp.), and broomsedges (*Andropogon* spp.). Limited areas of wiregrass, and these other herbaceous species, are found within the mesic flatwoods of the Preserve due to fire exclusion.

Mesic flatwoods require frequent fire (2 to 4 year intervals). Longleaf pines have thick bark to protect them from fire and their seeds need the mineral soil and open sunlight that fire provides to germinate. Longleaf pine during the grass stage is fire resistant. Several species require fire to reproduce. Wiregrass requires fire to flower, along with a number of other characteristic herbs.

The need for frequent fire to control hardwoods, shrub thickets and unnaturally dense pine stands has been documented for many years. It is also well documented that fire stimulates flowering in many flatwoods herbs and that frequent fire increases species richness and

abundance. Controlled burns in mesic flatwoods also indirectly determine the fire frequency and season for all the adjacent natural communities.

Statistics from lightning caused fires suggest that most areas in Florida would naturally burn at the beginning of the lightning season. Growing season fires (April to mid-August) are known to be necessary for flowering and seed set in wiregrass.

The mesic flatwoods on DLSCP will initially receive fire surrogate treatments to reduce fuel loads in the shrub layer. Following this fuel reduction, burning will be implemented where and when feasible. The Preserve is surrounded by numerous smoke sensitive areas, so fire surrogate activities will continue to be used when fire has not been able to be prescribed within the range of recommended fire return intervals. The fire return interval for the DLSCP mesic flatwoods is 2-4 years.

Scrubby Flatwoods – Scrubby flatwoods have an open canopy of widely spaced pine trees and a low, shrubby understory dominated by scrub oaks and saw palmetto. Scrubby flatwoods differ from the aforementioned scrub in the presence of wiregrass, a greater abundance of saw palmetto, and/or the presence of typical flatwoods shrubs such as gallberry and fetterbushes. Structurally it differs from scrub in its lack of a continuous cover of scrubby oaks.

The scrubby flatwoods at the Preserve have a canopy of longleaf pine, slash pine, and sand pine (*Pinus clausa*). The understory consists of a closed cover of sand live oak, myrtle oak, Chapman's oak, saw palmetto, gallberry, rusty Lyonia and fetterbush. Some instances of grasses were found which include wiregrass, broomsedge bluestem (*Andropogon virginicus*), and shiny blueberry (*Vaccinium myrsinites*). The majority of the scrubby flatwoods found within the Preserve has a closed canopy of scrub oaks in the 3 to 4 meter range in height due to the lack of fire.

Scrubby flatwoods are often associated with scrub and/or mesic flatwoods. Therefore many of the rare species associated with the aforementioned scrub are also likely to inhabit scrubby flatwoods.

Scrubby flatwoods have a more continuous ground cover and more pine needle leaf litter than scrub, therefore historically have burned more readily than scrub. But due to less ground cover grasses, scrubby flatwoods tend to burn less readily than mesic flatwoods. Therefore scrubby flatwoods historically have burned at a frequency intermediate of the two, most likely in the 5 to 15 year range. Light ground fires in the surrounding mesic flatwoods tend to enter scrubby flatwoods and extinguish, leading to a patchwork of recently burned and unburned portions, a situation which has been found to be favorable for scrub-jays. Therefore variability in season and frequency of prescribed fires to produce a mosaic of burned and unburned patches would be the most desirable for maintaining high biotic diversity within this community.

The scrubby flatwoods on the Preserve will be treated similar to the mesic flatwoods, in terms of introduction of fire surrogates prior to initiation of fires. Upon initiation of fire

implementation, scrubby flatwoods will be incorporated into mesic flatwoods burn units, thereby producing the typical patchiness described above. That is, fires will be started in the mesic flatwoods and allowed to carry into or burn out in the scrubby flatwoods. The target return interval will be 5 to 15 years. If a section of scrubby flatwoods within a larger unit has not burned for more than 10 years, fires will be deliberately set within that community during the next burn rotation.

Maritime Hammock – Maritime hammock is predominantly evergreen hardwood forest growing on stabilized coastal dunes lying at varying distances from the shore.

The maritime hammocks found within the Preserve have a closed canopy dominated by live oak, cabbage palm, southern magnolia, and pignut hickory. The subcanopy is dominated by red cedar (*Juniperus virginiana*), yaupon holly (*Ilex vomitoria*), saw palmetto, Brazilian pepper, red bay (*Persea borbonia*), wild coffee (*Psychotria nervosa*), wax myrtle, and wild orange (*Citrus* spp.). The invasive exotic Australian pine (*Casuarina equisetifolia*) was also noted within the maritime hammock communities of the Preserve, although it is limited in occurrence.

As with mesic hammocks, fire is naturally rare in this community and is not proposed within this habitat. Where fire hazards exist near maritime hammocks, fuel reduction will be implemented. Due to location, this will occur in areas where adjacent habitats are in areas where fire is not likely feasible, thus, fire surrogates will be implemented to control adjacent habitat fuel loads.

Wet Prairie – Wet prairie is an herbaceous community found on continuously wet, occasionally inundated, soils on somewhat flat or gentle slopes between lower lying depression marshes, shrub bogs, or dome swamps and within slightly higher wet or mesic flatwoods, or dry prairies.

The wet prairies found within the Preserve are small depressions within wet flatwoods and mesic flatwoods. The groundcover consists primarily of yellow eyed grass (*Xyris* spp.), St. John's wort (*Hypericum fasciculatum*), maidencane, panic and witch grasses (*Panicum* spp. and *Dichanthelium* spp.), beaksedges, and Carolina redroot.

Natural fires likely entered wet prairies from surrounding pine flatwoods and burned through them when they were dry enough to carry fire. It is estimated that wet prairies found adjacent to pine flatwoods historically had a fire interval of 2 to 4 years. In absence of fire, shrubs and trees invade wet prairie and shade out the light-loving herbaceous species. Further evidence of fire interval is the necessity of many of the dominant grasses that require fire to stimulate flowering. Wet prairies are sensitive to relatively slight physical alterations to the soil surface which can permanently alter the hydrology. Such disturbances include soil rutting by human disturbance or hog rooting. These disturbances can cause major changes in species composition that require expensive restoration to repair.

Wet Prairie in the Preserve can undergo extreme water fluctuations annually as well as within a given year. Despite fire exclusion, this community generally resembles historic

conditions. Increased fire return intervals would reduce the prevalence of encroaching woody vegetation that commonly occurs in the higher elevation areas on the edge of the prairies.

No fire surrogate activities are necessary prior to fire introduction in this habitat. The wet prairies will be burned in conjunction with the surrounding land type (primarily wet flatwoods) and included within adjacent burn units. The potential of a muck fire exists when allowing fire to encroach into a wet prairie lacking proper soil moisture. Soil moisture will be evaluated prior to inclusion of the wet prairie into the adjacent burn unit. Fire breaks will be utilized when the potential for a muck fire exists. Fire return intervals will be based on adjacent habitats and soil moisture at the time of burning adjacent habitats. No fire surrogate activities are recommended at this time. However, should hardwood encroachment exceed 10% of a prairie, herbicide application to reduce hardwoods may be implemented.

Coastal Hydric Hammock – Coastal hydric hammock is an evergreen hardwood and/or palm forest with a variable understory typically dominated by palms and ferns occurring on moist soils, often with limestone very near the surface. While species composition varies, the community generally has a closed canopy of oaks and palms, an open understory, and a sparse to a moderate groundcover of grasses and ferns. The coastal hydric hammock found within the Preserve has a canopy which is 100% cabbage palm. The subcanopy consists of swamp bay, wax myrtle, and saw palmetto. The herbaceous cover is dominated by Virginia chain fern (*Woodwardia virginica*), cinnamon fern (*Osmunda cinnamomea*), and royal fern (*Osmunda regalis* var. *spectabilis*).

Fire is not considered an important component of coastal hydric hammock dynamics; however they do burn occasionally. Due to this coastal hydric hammock being dominated by old growth cabbage palm fire most likely occurred historically. Cabbage palms are fire tolerant and intense fires favor the species.

No fire surrogate activities or direct fires are proposed for this habitat. Due to size and location, wildfire is unlikely in this habitat.

Bottomland Forest – Bottomland forest is a deciduous, or mixed deciduous/evergreen closed-canopy forest within riverine floodplains and in shallow depressions.

The dominant canopy species found within this community at the Preserve include laurel oak (*Quercus laurifolia*), sweetbay (*Magnolia virginiana*), cabbage palm, swamp tupelo (*Nyssa sylvatica* var. *biflora*), water oak (*Quercus nigra*), sugarberry (*Celtis laevigata*), American elm (*Ulmus americana*), and red maple (*Acer rubrum*). The understory consists of swamp dogwood (*Cornus foemina*), dahoon holly (*Ilex cassine*), swamp bay, shiny lyonia (*Lyonia lucida*), buttonbush (*Cephalanthus occidentalis*) and wax myrtle.

Bottomland forests are not considered fire-adapted communities. The bottomland forests will be treated in a manner similar to the mesic hammocks described above. Note that most of the bottomland forest is bordered by mesic hammock, making this a feasible implementation.

Salt Marsh – Salt marsh is a largely herbaceous community that occurs in the portion of the coastal zone affected by tides and seawater and protected from large waves, either by the broad, gently sloping topography of the shore, by a barrier island, or by location along a bay or estuary.

In the case of the Preserve the salt marshes are protected from wave activity by barrier islands. The dominant species are smooth cordgrass (*Spartina alterniflora*) and needle rush (*Juncus roemerianus*). The landward edge of the marsh consists of sawgrass (*Cladium jamaicense*), saltmeadow cordgrass (*Spartina patens*), marsh elder (*Iva frutescens*), sea oxeye daisy (*Borrchia frutescens*), and christmasberry (*Lycium carolinianum*). The salt marshes within the Preserve also have sporadic black mangroves (*Avicennia germinans*).

Fire is known to occur in salt marshes, although sporadically, either by spreading from adjacent uplands or from lightning strikes in the marsh itself.

The salt marsh on DLSCP will be utilized as a natural fire break for adjacent habitat burn zone units, when the water depths are sufficient to allow fire to encroach without threat of muck fires.

Mangrove Swamp – Mangrove swamps are dense forests occurring along relatively flat, low wave energy, marine and estuarine shorelines. Four species of mangroves occur in Florida consisting of red mangrove (*Rhizophora mangle*), black mangrove, white mangrove (*Laguncularia racemosa*), and buttonwood (*Conocarpus erectus*). The four species can occur either in mixed stands or often in differentiated, monospecific zones that reflect varying degrees of tidal influence, levels of salinity, and types of substrate. Red mangroves often dominate the lowest (deep water) zone, followed by black mangroves, then white, and finally buttonwoods which are normally found within the transition zone between the upland and wetland limits.

The mangrove swamps on DLSCP are primarily dominated by black mangroves, although both red and white mangroves occur as well. Many of the mangrove systems are bordered by salt marsh on the waterward edge. Some areas, typically near US Hwy 1, continue to be invaded by Brazilian pepper, a topic addressed in later sections of this Plan.

No fire or fire surrogate activities will occur within the mangrove swamps.

Blackwater Stream, Clearing and Impoundment - No fire activities are related to these communities.

Improved pasture – A small portion of improved pasture is included within the Preserve. This area consists of actively maintained bahiagrass (*Paspalum notatum*). It is currently used for parking equestrian trailers used by visitors of the Preserve. Gopher tortoises actively use this area for forage and a few burrows were also identified.

This habitat will be utilized as a fire break in conjunction with the surrounding habitats.

Successional Hardwood Forest – Successional hardwood forests are best described as closed-canopied forest dominated by fast growing hardwoods. These forests are either invaded natural habitat due to lengthy fire-suppression or old fields that have succeeded to forest. The subcanopy and shrub layers of these forests are often dense and dominated by smaller individuals of the canopy species.

This habitat is found along a canal which was historically draglined through a wetland hardwood forest. The existing vegetation consists of a canopy of laurel oak, slash and longleaf pine, cabbage palm, sugarberry, and southern magnolia. This community is expected to reach a climax community similar to the mesic hammocks described above, through natural succession.

No fire activity is to occur within this habitat. Should a wildfire occur, the area will be re-evaluated to determine if fire should be re-introduced.

PRESCRIBED BURNING PROGRAM

Restoration of a pre-Columbian landscape is impractical and probably impossible on DLSCP because of the area's location nearby several smoke-sensitive areas. Accounts of pre-settlement communities are vague and based largely on general inferences from post-settlement communities, thus, precluding replication. Some former plant community attributes, however, can be restored by applying a variety of fire regimes. There is no single fire regime that can be applied across communities to achieve ecological restoration and maintain community heterogeneity. Therefore, fire frequency, intensity, pattern of spread, and regularity must be varied among and within burn units. The DLSCP Burn Plan has been divided into multiple burn units based on existing fire breaks and habitat boundaries. Where a fire-dependent community exists, but is not shown as a burn unit, it is due to logistics precluding fire a feasible management tool and fire surrogates will be used to achieve the Management Plan goals.

The following parameters will be defined within each burn prescription submitted to Department of Forestry (DOF) for approval.

- Fireline
- Size and Arrangement of Burns
- Type of Burn
- Season and Time of Day
- Optimal Weather Conditions

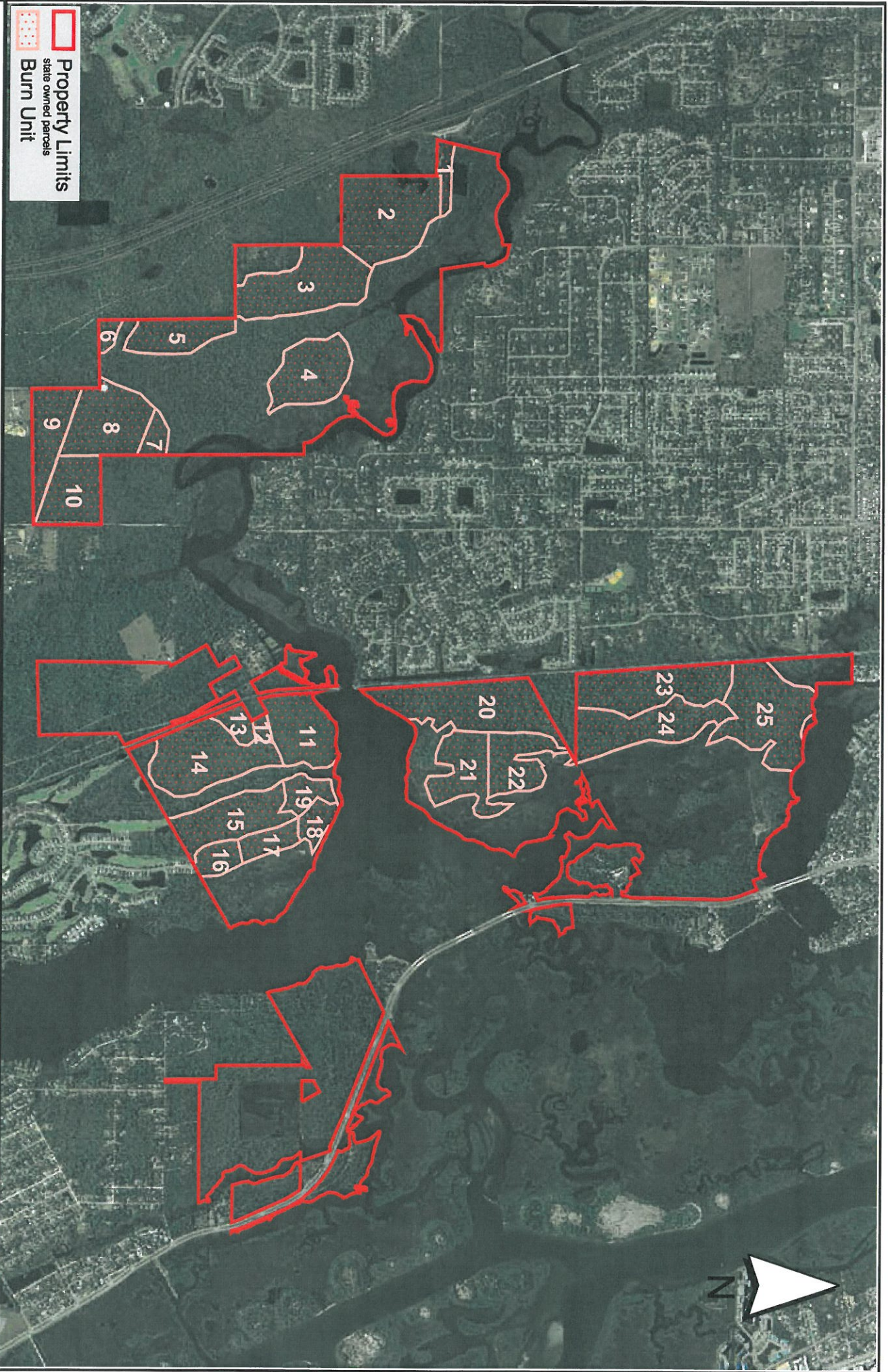
- Smoke Management
- Personnel
- Equipment
- Notification and Emergency Contact Information
- Evaluation of Burn

Special Considerations

Attention will be given to the safety of neighboring private properties. The firebreaks along these properties will be reinforced; a pumper unit and/or fire-plow will be stationed nearby to expedite response time, if required. Gopher tortoises (*Gopherus polyphemus*) seem somewhat dependent on vegetation responses to fire, and research has shown no adverse effects on this species from prescribed burning (Means and Campbell 1981). Although individual tortoises may be destroyed by fire on rare occasions, prescribed burning provides better habitat for tortoise populations than unburned areas (J. Diemer, FGFWFC, pers. commun.). Growing season burning may affect various wildlife species that are highly active during this period. Moreover, growing season burns may also adversely impact other breeding patterns of reptiles, birds and mammals, particularly by fast-moving headfires. Consideration for summer burning will be given to areas having desirable burning conditions.

Growing Season Burning Procedure

Growing season prescribed burning is generally performed for site preparation and hardwood brush control. High air temperatures reduce the amount of heat needed to raise plant temperatures to lethal levels. Actively growing plants are more easily killed by fire than dormant plants, which results in better hardwood brush control than winter fires (Mobley et al. 1973, G. Evans, Tall Timbers Research Station, pers. commun.). In addition, growing season burns promote an increase in herbaceous vegetation growth, promote species diversity, release planted longleaf pine seedlings from vegetative competition, help control brown-spot disease and mimic naturally occurring summer lightning fires. Therefore, prescribed burning in the summer will be the preferred method on DLSCP with special attention given to wildlife and weather conditions. Growing season burns will be conducted during *April-September* with desired wind speed and relative humidity as appropriate. Fires in these areas will be used in conjunction with other land management practices.



Source : 2006 Volusia County True Color Aerials

Date : 08/16/10

Path : Z:/10041/lmp.apr

2500

0

2500 Feet

BURN UNIT MAP DORIS LEEPER SPRUCE CREEK PRESERVE VOLUSIA COUNTY, FLORIDA



Civil Engineering • Landscape Architecture
Planning • Environmental Services • Transportation

300 Interchange Boulevard
Ormond Beach, Florida 32174
ph 386 677-2482 • fx 386 677-2505

www.zevcohen.com

APPENDIX J:
Timber Assessment / Timber Plan

Doris Leeper Spruce Creek Preserve

Timber Assessment & Plan

Conducted and Written By:
Zev Cohen & Associates and Volusia County

Purpose

This document is intended to fulfill the forestry assessment requirement for the Doris Leeper Spruce Creek Preserve (DLSCP). The goal of this assessment is to evaluate the potential and feasibility of utilizing silviculture techniques to assist managers in achieving objectives at this facility.

General Information

Seventeen (17) ecological communities exist within the boundary of this property. These communities range from Scrub uplands to Blackwater Stream and various wetland and upland habitats in between. Some communities have been altered due to past land use.

To better understand timber management methods, knowledge of a few silviculture terms is useful. The cross sectional area (in square feet) of an individual tree measured four and one-half feet above the ground is its Basal Area (BA). Basal Area per acre is the sum of the Basal Area of every tree within a stand divided by the number of acres in the stand. It is used as a measure of a forested area's tree stocking and density. The diameter of an individual tree taken at this height (four and one-half feet above the ground) is referred to as its diameter breast height or DBH. This measurement is used in calculating the Basal Area and combined with height can determine volume of each tree. When the term Basal Area is used as a stand alone term, it is referring to the Basal Area per acre of a stand.

Slash pine exhibits very fast height growth averaging 3 feet annually until about age 9, after this age growth begins to stall due to competition within the stand. More than half of the annual height growth (52%) is completed by April of each growing season. Diameter growth is affected by stand density about 5 years after seeding. Mean annual diameter growth for the first 20 years is about ½ inch for a density of 194 trees per acre. Between the ages of 5 and 9 tree diameter growth drops about 56 % with this density (Bennett, Frank 1963).

Restoration of longleaf pine within its former range is advocated by a number of public and private associations and by governmental agencies, and is advocated by Volusia County where mesic and xeric flatwoods occur. Some land managers desire to employ lower intensity management, particularly longer rotation ages, for which longleaf pine is well suited (Boyer 1990). Very little growth and yield modeling has been accomplished with longleaf pine plantations. The only existing model is restricted to unthinned stands (Lohrey and Bailey 1977). There is however a large volume of data on growth and yield for naturally occurring and naturally regenerated longleaf pine (Goelz and Leduc) (Somers and Farrar 1991).

Fully stocked pine stands have enough trees per acre of a size large enough to utilize the growing space without causing over-crowding. Pine stands with 70 to 100 sq. ft. BA are considered fully stocked, although lower BA's are typically used in managing for natural pine flatwood stands (refer to County's Desired Future Conditions). It requires more, smaller diameter trees than it does larger diameter trees to equal one square foot of basal area. (For example: It takes 357 evenly spaced, six-inch diameter breast height trees per acre to equal 70 sq. ft. BA. Whereas, only 89 twelve-inch DBH trees per acre equals the same 70 sq. ft. BA.).

Pine plantations should be thinned when live crowns in the majority of the dominant and co-dominant trees have been reduced to approximately 1/3 of their total height. Simply, these stands should be thinned to 60 – 70 sq. ft. BA per acre each time they reach 100 sq. ft. BA per acre or more. This will help ensure a stand of vigorous healthy trees. An added benefit of opening up the canopy is that more sunlight will reach the forest floor increasing forage production for wildlife. Once the stand has reached maturity, it may be harvested, then planted or naturally regenerated. If prescribed fire is used prior to any thinning, it is recommended a winter burn be used to condition the stand and lower the chance of high mortality.

A variety of thinning methods can be utilized. Thinning options to consider are: normal thinning with relatively even spacing, group selection, group seed tree, or a combination of all three. Once the plantation becomes mature enough to produce seed, natural regeneration should become established without much difficulty.

One advantage of thinning is that the understory will regenerate the vegetation necessary to allow carry prescribed fire more safely and eliminate the potential for canopy fires. However, immediately after any kind of ground disturbance the area may be susceptible to invasion by exotic/invasive plant species. This is something to be especially concerned with in this part of Florida, and it is recommended that a plan be in place to address this potential problem prior to any harvest activities.

Tracts

Bolt Property: Description

The Bolt tract is a 230 acre tract consisting of coastal hydric hammock, mangrove swamp, maritime hammock, mesic flatwoods, salt marsh, and scrub. Only the scrub and mesic flatwoods are suggested for potential thinning. These areas are somewhat restricted in size on the site and only the mesic flatwoods, which is quite restricted, has sufficient BA for harvest consideration.

Recommendation:

The site has moderately difficult access, primarily off of Art Center Avenue on the south boundary of the tract, which may have weight restrictions and is located adjacent to a residential subdivision, making transport to and from the site problematic. No thinning or harvesting of pine is recommended at this time.

Ground level clearing within the scrub and mesic flatwoods, through mechanical thinning is recommended. Following this thinning, the site should be evaluated for winter burns, and following these events, re-evaluated for potential silviculture activities.

Martin's Dairy: Description

The Martin's Dairy tract is approximately 665 acres in size and is comprised of several habitats including salt marsh, black water stream, impoundment, wet prairie, bottomland forest, mesic hammock, scrubby flatwoods, scrub, and improved pasture. The flatwoods and scrub habitats are areas with potential to utilize silviculture activities, and these habitats are abundant onsite. The pine stand density and BA are low overall, especially in the scrub community. The scrub has some remnant mature sand pine, but is primarily converting to an oak and *Lyonia* dominated scrub with little pine regeneration. The flatwoods communities contain several species of pines with large DBH, but low densities.

Recommendation:

For the scrub habitat, mechanical thinning of the shrub / subcanopy layer is recommended, followed by prescribed fire. As part of the thinning process, it is recommended to determine the viability of oak and *Lyonia* harvesting to assist in associated costs. There are several known *Lyonia* harvesting operations located in Volusia County. The likelihood of obtaining revenue from oak harvesting is low.

For the flatwoods habitats located west of the slough / creek that separates this parcel, it is recommended that the County commence coordination with Florida DOT to determine if access via the abandoned rest stop on I-95. Once access is obtained, it is recommended to conduct two winter burns prior to any growing season burn. For harvesting, commence harvest of non-longleaf pines to promote longleaf as the dominant pine in these habitats.

Rose Bay: Description

The Rose Bay tract is approximately 642 acres in size and is comprised of several habitats including maritime hammock, mesic flatwoods, salt marsh, scrubby flatwoods, wet flatwoods, and wet prairie.

Recommendation:

This is the only site in DLSCP with a sufficient BA to warrant pine harvest / thinning. However, it is not readily accessible by the equipment necessary to conduct the operation. The only access is from US Highway 1, and across a salt marsh. As the stand matures, it may become valuable enough to allow the necessary modifications to reach the timber stand. At this time, the stand is of sufficient BA, but individual trees are not large enough in DBH to warrant high enough value to overcome accessibility issues. This parcel should be re-evaluated if timber prices undergo any dramatic increase in price, or once the individual pines are of significant DBH (e.g., >24").

Sleepy Hollow: Description

This stand is about 20 acres of maritime hammock. Typical species are present throughout this tract and little timber management is necessary for optimal conditions.

Recommendation:

Management in this area will be limited to removal of exotic species encroachment. No burning or silviculture activities are recommended for this tract.

Turnbull: Description

The Turnbull tract is approximately 392 acres in size and is comprised of several habitats including salt marsh, mangrove swamp, maritime hammock, mesic flatwoods, scrubby flatwoods, scrub, and successional hardwood forest. The scrub and flatwoods communities east of the FEC Railroad do not currently have sufficient density or BA for harvest or thinning. Some areas of the flatwoods west of the FEC, including flatwoods extending onto publicly managed lands that are not under state ownership, do have sufficient BA for pine thinning.

Recommendation:

The scrub and flatwoods east of the FEC should be mechanically thinned, and burned when possible. The stand should be re-evaluated in five to ten years to determine if sufficient BA exists at that time to warrant silviculture operations. For areas west of the FEC, mechanical thinning of the understory/ groundcover, and repeated winter burns prior to any growing season burns are recommended. Thinning of extant pine stands are warranted here.

Prescribed Fire

Prescribed fire is an important tool for ecosystem management in Florida. Before European settlement, natural fires occurred at regular intervals on an average of two to five years. These fires reduced the fuel load, produced a seedbed for pine regeneration and released nutrients back into the soil. Prescribed fire, coupled with a well-planned timber harvest, is often the most economical and responsible method for conducting ecosystem management, and restoring areas back to natural conditions.

The major objective when prescribed burning in timber and overgrowth in natural areas should be minimal mortality of the trees. Historic natural fires caused very little tree mortality except in small seedlings because they burn mostly on the finer fuels of wiregrass and pine straw. For fire-suppressed ecosystems, a major regional conservation goal has been ecological restoration, primarily through the reinitiating of historic fire regimes. Unfortunately, fire reintroduction in long unburned stands can have novel, undesirable effects. When burning, even in mature timber, it must be kept in mind that not all fire is good. A hot fire may not initially kill trees, but will stress them enough to dramatically increase their susceptibility to insect and disease attack. This is especially true when combined with other stresses, such as drought or flood.

Many of the stands in DLSCP are long unburned stands. Therefore, mechanical clearing and winter burning are necessary in several areas prior to re-introduction of natural, growing season, fire regimes.

Economics

Timber sales are common practice in this region, and several pine silviculture plantations exist in the vicinity, west of New Smyrna Beach and Port Orange. With such readily available timber and large acreage available nearby, combined with the identified access difficulties noted above, revenue from timber sales is expected to be inconsequential. The best available opportunity at this time is the potential sale of Lyonia (known as dragonwood in the floral market) from Martin's Dairy.

Access

DLSCP maintains access gates providing entry point for each tract. Access to Martin's Dairy tract is from a County-maintained road and this tract has the best access. The west side of Turnbull also has readily available access. The east side of Turnbull and Bolt tracts only have access through a residential subdivision, which limits the load capacity of the trucks and the likelihood of successful large harvest operations. Rose Bay is only accessible across an existing, at-grade field road through a salt marsh. Access here would require roll out mats or aerial access. Each severely limits the viability of conducting silviculture on the tract.

Summary

DLSCP currently has limited acreage of timber stands in which silviculture treatments may prove beneficial to achieving the stated habitat restoration and management goals. It is possible to manage this area in such a manner to provide a more natural appearance, meet local objectives and produce limited revenue through timber harvests in the future. The revenue producing potential of the area is low. The most practical application of silviculture on this property is a tool in achieving forestry objectives and for reducing wildfire hazards.

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APPENDIX K:
Recreation Plan

1.0 INTRODUCTION

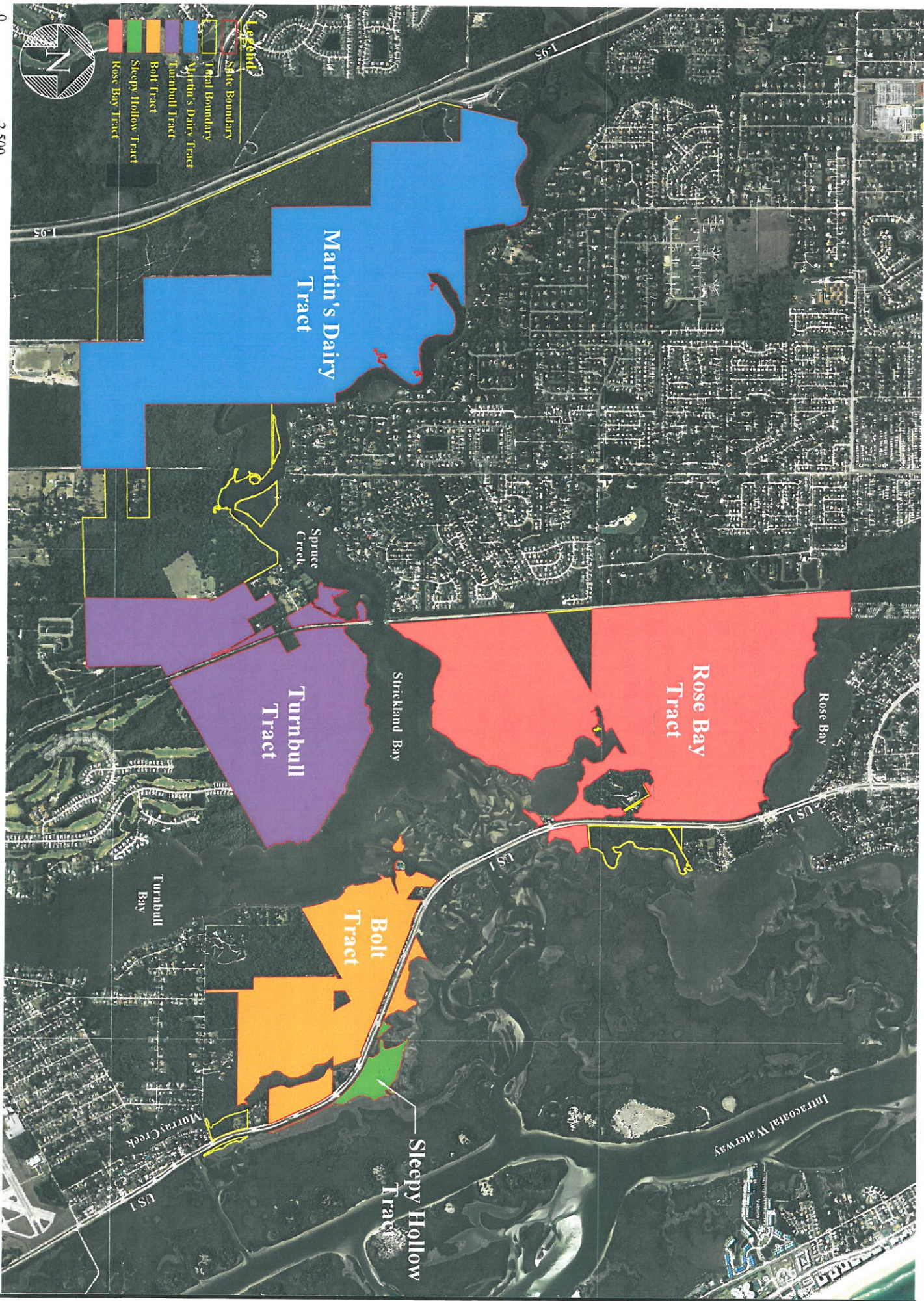
Doris Leeper Spruce Creek Preserve (DLSCP, Preserve) is a nearly 2,500 acre multi-habitat preserve managed by Volusia County. The Preserve provides public access and outdoor, resource-based recreational and educational opportunities to the public.

DLSCP consists of numerous parcels owned by various public entities. The total size of the Preserve under public ownership is 2,477 acres. Due to reasons outlined in the following section, the focus of this Recreation Plan is aimed at lands that are owned in full or part by the State of Florida (Board of Trustees of the Internal Improvement Trust Fund, or simply BOT). For the purpose of management, the County considers the entire Preserve as one complete managed area; however, regulations exist that require analysis of specifically owned parcels.

Thus, two levels of identification exist: The Preserve in its entirety (2,477 acres) and the state-owned lands portion of the Preserve (1,921 acres). Throughout this document, both levels will be discussed. The focus of this Plan is on those particular state-owned parcels, and unless otherwise noted, references are to the state-owned parcels. The exception is use of the word “Preserve” which will refer to the entire Preserve, regardless of ownership.

DLSCP is located in eastern Volusia County, approximately 8 miles southeast of Daytona Beach and 43 miles northeast of Orlando. The property lies within three (3) local jurisdictions: the City of Port Orange, the City of New Smyrna Beach, and Volusia County. DLSCP is generally bordered on the north by Spruce Creek and Rose Bay, on the west by Interstate 95, on the south by developed and undeveloped private residential lands, and on the east by US Hwy 1, although some parcels do occur east of US 1.

The Preserve consists of tracts separated by Spruce Creek, Strickland Bay, Turnbull Bay, Murray Creek, the FEC railroad and US 1. These features result in tracts that are somewhat disjunct in terms of connectivity and management. As such, the individual tracts are referred to by name and evaluated individually. Only state-owned lands are labeled and identified by tract; non-state owned lands are simply shown to occur within the overall boundary.



Recreation Master Plan

2.0 PURPOSE AND SCOPE

This Recreation Plan is developed as a supplement to the overall unit Management Plan, which was governed by requirements of the Florida Statutes, Florida Administrative Code, and guidelines in the State Lands Management Plan. The particular regulations mandate that public lands held in title by the BOT, in full or in conjunction with other entities, must be evaluated to determine that the lands are being managed for the purpose of acquisition.

This document is intended to provide information on public access and outdoor recreation on the Doris Leeper Spruce Creek Preserve (DLSCP) as it relates to the two primary goals of acquisition; a) the conservation and protection of natural and historical resources and b) resource-based, public outdoor recreation which is compatible with the conservation and protection of these public lands.

This Recreation Plan includes establishing the goals and objectives that will direct land managers, an inventory of current recreational uses and facilities, planned future uses and a priority schedule for implementation. Facilities and capital improvements, whether existing or planned, are considered when discussing uses, as they are necessary to support the evaluated uses. All uses discussed within this Recreation Plan were evaluated in the overall unit Management Plan and are considered to be in concert with the stated objectives of the Management Plan, although some require specific conditions. For this assessment of all uses evaluated, please refer the Management Plan, Section III.

All planned infrastructure facilities or outlined in this document are subject to the granting of appropriate permits, easements, licenses, and other required legal instruments.

3.0 GOALS AND OBJECTIVES

The goals listed below are related to public access and outdoor resource-based recreation and education where compatible with the conservation and protection of the extant natural and cultural resources. Note that facilities and infrastructure are included, as these are necessary to support the public use element.

The public has been included in development of the specific goals and objectives for the Preserve. Public involvement has included a Public Hearing held at the Atlantic Center for the Arts (adjacent to the Bolt Tract) in New Smyrna Beach. The purpose of the hearing was to receive feedback on the overall unit Management Plan. This hearing was followed by a Management Plan Advisory Group (MPAG) meeting that reviewed the public input provided at the hearing and provided final recommendations for inclusion into the unit Management Plan and this Recreation Plan.

Goal 1: Facilities and Infrastructure
<ul style="list-style-type: none">- <i>Develop and Maintain/Improve the capital facilities and infrastructure necessary to meet the goals and objectives of this management plan.</i>

The facilities and infrastructure are numerous and are supported by additional resources located on adjacent County-managed lands within the Preserve. For the purpose of DLSCP facility and infrastructure management, the County considers the entire managed area, regardless of ownership, as one complete unit. Overall, the facilities and infrastructure currently available and in operation are sufficient to meet the stated goal.

Specific Objectives RE Facilities and Infrastructure:

- Continue to monitor, maintain and relocate as necessary a system of multi-use trails
- Continue to use existing facilities on adjacent County managed lands for support of DLSCP state-owned lands
- Construct, maintain and update signage, public parking areas, and kiosks
- Maintain gates at appropriate locations to regulate traffic and visitation
- Monitor existing facilities for illegal activities and vandalism
- Consider the development of additional facilities/infrastructure for security purposes
- Acquire additional land within the Optimal Boundary as funding allows

Goal 2: Public Access, Recreational and Educational Opportunities
--

- <i>Provide public access, recreational and educational opportunities.</i>

The Preserve provides recreational activities including mountain biking, equestrian access, hiking, birding, boardwalks, canoeing, fishing, pavilions and picnic areas, overlook towers, and restrooms. Additional resources, including canoe and kayak launches and/or landings, fishing piers, and overlook platforms are planned as funding becomes available but are not critical to meet the goals established here.

Objectives:

- Implement a Recreation Plan to include but not limited to:
 - Manage user groups / user impacts
 - Identify existing abuse
 - Provide enforcement (incl. methods)
 - Establish approved trail system / uses / locations
 - Provide for primitive camping
 - Provide canoe launch / landing
 - Erect educational and regulatory signage
 - Assess use mix / conflicts and mitigative measures
 - Assess potential resource (cultural and natural) impacts
 - Coordinate with partners / local jurisdictions
- Cooperate with other agencies, cities, stakeholders, to provide educational and recreational opportunities
- Educate the public on the presence of protected resources and the importance of preservation
- Monitor and maintain a system of multi-use trails
- Exclude off-road vehicle (ORV) use
- Provide and enhance interpretive/education programs (i.e., website, kiosk, guides website)
- Continue to support the Legacy Program

- Provide additional recreational and educational facilities as funding allows

4.0 EXISTING USES AND FACILITIES

In its current state, the Preserve provides numerous opportunities for public access and outdoor recreation and education. This includes trails for hiking, biking and equestrian use, expansive forests for observing natural ecosystems, native flora and fauna, access to waterways for fishing, kayaking and canoeing, and unique opportunities to observe historical features. The facilities are inventoried below, and are discussed and shown by tract in the Master Recreation Plan by Tract section.

The Preserve contains several miles of trails that traverse throughout the five state owned tracts and in some locations are interconnected to one another, or provided access via the adjacent, non-stated owned parcels. Access to multiple habitats, some of which are considered imperiled (such as the Florida scrub), topographic changes unique to the area, and scenic vistas are unlike any other in the region.

The waters within and surrounding the Preserve are popular for canoeing, kayaking, recreational boating and fishing. These waters also provide nature enthusiasts an alternative viewpoint for observing wildlife that utilizes the estuarine shorelines and aquatic habitats. Spruce Creek has been recognized as State paddling trail by DEP's Office of Greenways and Trails (the Spruce Creek Paddling Trail brochure is attached). Spruce Creek is also listed by the State as an Outstanding Florida Water (OFW) and has a designated Riparian Habitat Protection Zone, both of which provide for greater protection from runoff pollutants from upstream sources and development along the river.

Hunting is prohibited on the Preserve at this time. The County plans to coordinate with the Florida Fish and Wildlife Conservation Commission on this topic. Any changes to the current program will be considered based on their analysis and recommendations.

Another opportunity for resource-based recreation is presented by the ability to observe a site on the Martin's Dairy tract which is listed the National Historic Register - the Spruce Creek Mound. Additional program information is to be developed and utilized for this resource as an interpretive site for the cultural resources in the area. In general, and in conformance with state regulations, the locations of the archaeological resources are not provided to the public in order to protect the resource. The Spruce Creek Mound is the primary resource that is made available for educational use.

Revenue is not generated via access, recreational or educational opportunities. The County does obtain nominal revenue for group camping on the adjacent Spruce Creek Park.

Below is a summary of uses and related facilities and capital improvements that exist on DLSCP.

Table 1. Inventory of Doris Leeper Spruce Creek Preserve Public recreational and access facilities, February, 2011.

Current Use / Infrastructure	Tract				
	Martin's Dairy	Turnbull	Bolt	Sleepy Hollow	Rose Bay
Access Point	1	1	1	1	2, 1*
Parking	1		1	1	1*
Access Gate	1	2	4	1	2, 1*
Information Kiosk	1				3*
Trails**(H,B,E)***	H B E	H B E	H B	H	H B
Pavilion	1****			1	1, 1*
Boardwalk					1
Observation Tower					1
Camp Sites (Special use – permit required)					17*
Fishing Access			2	1	1*
Canoe/Kayak Landing/ Launch					1*
Picnic Area					24*
Playground					1*
Restroom					2*
Historic Site Open to Public	1				

*Located on adjacent Spruce Creek Park for Rose Bay;

***H,B,E = Hiking, Biking, Equestrian. Vehicle trails are for staff and approved use only. Equestrian use on Turnbull is for the west portion only

****Located on adjacent public land between Turnbull and Martin's Dairy Tracts

Updates to this table in subsequent years will provide easy tracking for accomplishments achieved by the County.

5.0 CHALLENGES AFFECTING MANAGEMENT

An important focus here will be conducting public meetings with the user groups and provide more interface between the managing agency and the user groups.

This section focuses on discussion items that affect management and implementation of the Recreation Plan. The issues listed have been discussed in various places throughout the Management Plan and this Recreation Plan, and are provided here to ensure attention is paid to these details or comments that may otherwise be lost amongst the vast data provided elsewhere.

Periodic closures to the public: Notify users via signage, meetings, and/or website on area closures / trail re-routing during habitat restoration projects. Educate the public on schedule of events, reasons for restoration, estimated re-opening dates and follow up information on the results of the restoration.

Protected and/or rare species: The presence of listed species provides environmental education opportunities for the general public. However, user group management is an important component of these species continued existence or restoration efforts. Identification of the protected species and notification that they are protected by law, and an important part of the ecosystem should be a major point of education as it relates to these species. This education can be accomplished through kiosks, brochures, and/ or internet resources made available to user groups. Warnings against the taking of these or any wildlife species should be included in such educational materials. An example would be a kiosk display about scrub-jays that would display the importance of the habitat restoration practices that require occasional area closures to restore habitat for this federally endangered species. This should include what the current scrub habitat looks like and what it is intended to look like in the managed condition.

Archaeological and cultural resources: To protect archeological and cultural resources, the County does not provide the general public with information regarding location of these sites, with the exception of Spruce Creek Mound, where an interpretive kiosk is planned. Protection of these identified cultural resources is a key management objective for the Preserve. Interpretation of this resource along with the other lesser mounds and shell middens scattered through the surrounding areas is a key component to the educational programs proposed for the Preserve.

Erosion control and resource impact issues: During the planning of recreational activities slope is a more important concern than actual elevations with regards to minimizing ecological impacts. On the project site, the steepest slopes are associated with bluff areas in the western portion of the project site (primarily the Martin's Dairy tract). Multi-use trails, especially equestrian and bike trails, proposed in proximity to these areas should be field verified to avoid excessively sloped areas. This will minimize sedimentation and erosion problems in the future and protect surface water quality. Existing trails are used by these groups, but the appropriateness of the trail locations have not been evaluated by the County. The most commonly used trails, especially on Martin's Dairy, were largely created by user groups.

6.0 PRIORITY SCHEDULE FOR IMPLEMENTATION

The short and long term goals established in the unit Management Plan, along with their designated priority levels were used to develop a Priority Schedule. The schedule is divided into three chronological sections; 1-2 years, 2-5 years, and 6-10 years. The schedule will be used to prioritize expenditures related to capital facility improvements. Objectives may occur prior to the schedule as funding or other opportunities arise.

Schedule of Events Years 1 -2:

Goal / Objectives		Parameter(s)
1	Facilities and Infrastructure	
	Continue to monitor, maintain and relocate as necessary a system of multi-use trails	Recurring, ongoing task
	Monitor existing facilities for illegal activities and vandalism	Recurring, ongoing task
2	Public Access, Recreational and Educational Opportunities	
	Educate the public on the presence of protected resources and the importance of preservation	Kiosk and website information
	Exclude off-road vehicle (ORV) use	Recurring, ongoing task
	Continue to support the Legacy Program	Recurring, ongoing task

Note that construction of new facilities or improvements is not proposed for the first two years on State owned land. Public access and recreation is currently adequate to meet the objectives of the Management Plan and habitat restoration is deemed the most critical item for expenditures at this time.

Schedule of Events Years 3-5:

Goal / Objectives		Parameter(s)
1	Facilities and Infrastructure	
	Continue to monitor, maintain and relocate as necessary a system of multi-use trails	Recurring task
	Continue to use existing facilities on adjacent County managed lands for support of DLSCP state-owned lands	Recurring task
	Construct, maintain and update signage, public parking areas, and kiosks	Provided on an as-needed basis
	Maintain gates at appropriate locations to regulate traffic and visitation	Provided on an as-needed basis
	Monitor existing facilities for illegal activities and vandalism	Recurring task
2	Public Access, Recreational and Educational Opportunities	
	Cooperate with other agencies, cities, stakeholders, to assist with the development of educational and recreational opportunities	Host public meeting
	Monitor and maintain a system of multi-use trails	Recurring task
	Exclude off-road vehicle (ORV) use	Recurring task
	Provide and enhance interpretive/education programs (i.e., website, kiosk, guides website)	Kiosk, website information
	Continue to support the Legacy Program	Recurring task

The primary task within the 3-5 year time period, besides ongoing tasks, is to conduct another public meeting (note a Public Hearing was previously conducted to review the Draft Management Plan). The purpose of this meeting will focus on gathering information from the user groups of the Preserve regarding specific details. This will include such items as final location of approved trails, uses allowed on trails and/or tracts, general comments/ input of the user groups and input on the order and location of proposed new facilities in the following 5 years.

Schedule of Events Years 6-10:

Goal / Objectives		Parameter(s)
1	Facilities and Infrastructure	
	Continue to monitor, maintain and relocate as necessary a system of multi-use trails	Recurring task
	Continue to use existing facilities on adjacent County managed lands for support of DLSCP state-owned lands	Recurring task
	Construct, maintain and update signage, public parking areas, and kiosks	Install remaining kiosks; signage
	Maintain gates at appropriate locations to regulate traffic and visitation	Recurring task
	Monitor existing facilities for illegal activities and vandalism	Recurring task
	Consider the development of additional facilities/infrastructure for security purposes	TBD
	Evaluate the potential for additional land acquisition within the Optimal Boundary as funding allows	As funding allows
2	Public Access, Recreational and Educational Opportunities	
	Implement a Recreation and Land Use Concept Plan	Update inventory; determine priority for development / implementation; develop at least 1 water landing / access
	Cooperate with other agencies, cities, stakeholders, to assist with the development of educational and recreational opportunities	Conduct 1 public meeting – status update
	Monitor and maintain a system of multi-use trails	Recurring task
	Exclude off-road vehicle (ORV) use	Recurring task
	Provide and enhance interpretive/education programs (i.e., website, kiosk, guides website)	Update as necessary
	Continue to support the Legacy Program	Recurring task
	Provide additional recreational facilities as funding allows	Develop at least 1 water landing, as funding allows

New construction of facilities is considered to be a long term, low priority for the State owned lands of the Preserve. This is due to a number of factors including the immediate need to undertake habitat restoration activities, the limited funds available for management of the Preserve vs. the relatively high cost of habitat restoration and ongoing management, and the fact that access and recreation is considered sufficient at this time.

It is anticipated that the intensity of restoration efforts will be less in the 6-10 year range, than in the first 5 years following the development of the Management Plan. Thus, within this longer timeframe, the County plans to install at least one new facility, targeting a water landing / access point. Additional items beyond regularly recurring events include completion of any remaining kiosks and another public meeting to evaluate existing uses and desires at the time. The meeting should include an evaluation of how items have been implemented since the last meeting conducted (in the 3-5 year timeframe).

7.0 MASTER RECREATION PLAN BY TRACT

Following the direction of the objectives identified above, a Conceptual Recreation Plan has been developed. The Plan is depicted on aerial photographs and shows the overall Preserve and then provides details regarding each tract. The information was color coded to distinguish between existing site features and uses (in white text) and future, planned uses and features (orange text).

Tract Name: Martin's Dairy:

Description: The Martin's Dairy tract is approximately 665 acres in size fronting Spruce Creek it features the largest topographic change within the Preserve. It is comprised of several habitats provides access to scenic vistas and bluffs that overlook Spruce Creek. The diversity of habitats, from water to scrub, presents conditions favorable to view diverse flora and fauna with limited time or effort. This site also contains Spruce Creek Mound which is listed on the National Register of Historic Places; an interpretive kiosk is planned for this location. Educational information is provided at the kiosk located at the Martin's Dairy Road entrance.

Acreage: 665

Location: Southwest of Spruce Creek

Access: Vehicular via Martin Dairy Road
Connector trails from adjacent public lands

Current Hours of Operation: Sunrise to sunset – parking area not gated.

Existing Recreational Uses: Hiking, biking, and equestrian use.

Planned Additional Recreational Uses: Group camping, bluff viewing platform, water landing / access point

Parking: Yes – north end of Martin Dairy Road

Habitats: salt marsh, blackwater stream, bottomland forest, wet prairie, impoundment, mesic hammock, pasture, scrubby flatwoods, scrub

Potential impacts / mitigative measures:

- Erosion on bluffs / trail relocations and closures, develop overlook and/or landing
- Resource impacts / monitor trails and use, finalize trail locations and uses associated with each, develop primitive campsite that includes waste containers and signage, require permits
- Illegal dumping activities – gated access and monitoring by staff
- Spread of invasive species – monitoring by staff, early detection rapid response, evaluate further restrictions should introduction(s) be attributable to specific uses

Comments: The natural features, in combination with the extensive trail system, make this tract one of the most used on a daily basis. This area will face closures during habitat restoration efforts and may require significant public notice and involvement.



Martin's Dairy Tract

Tract Name: Turnbull:

Description: The Turnbull tract is approximately 392 acres in size fronting on Strickland Bay. This tract is really divided into two separate tracts, east and west of the FEC railroad. The eastern tract is only open via special events or coordination with County. The western tract is open daily and provides vehicular access, parking and connection to adjacent public lands.

Acreage: 392

Location: South of Strickland Bay, north of Turnbull Bay Country Club.

Access: East tract: Limited vehicular via Turnbull Estates Drive (inside Turnbull Bay Country Club). Can be accessed by water, but no approved landing exists. West tract: vehicular via Creekshore Trail and connector trails from adjacent public lands.

Current Hours of Operation: East side: Only by prior arrangement,
West side: (via Creek Shore Trail) 8 AM to sunset.

Existing Recreational Uses: East Side: none
West Side: Parking, (vehicular and equestrian),

Planned Additional Recreational Uses: A potential water landing, located at the northern end of the east tract. Will include canoeing, kayaking, hiking and primitive camping.

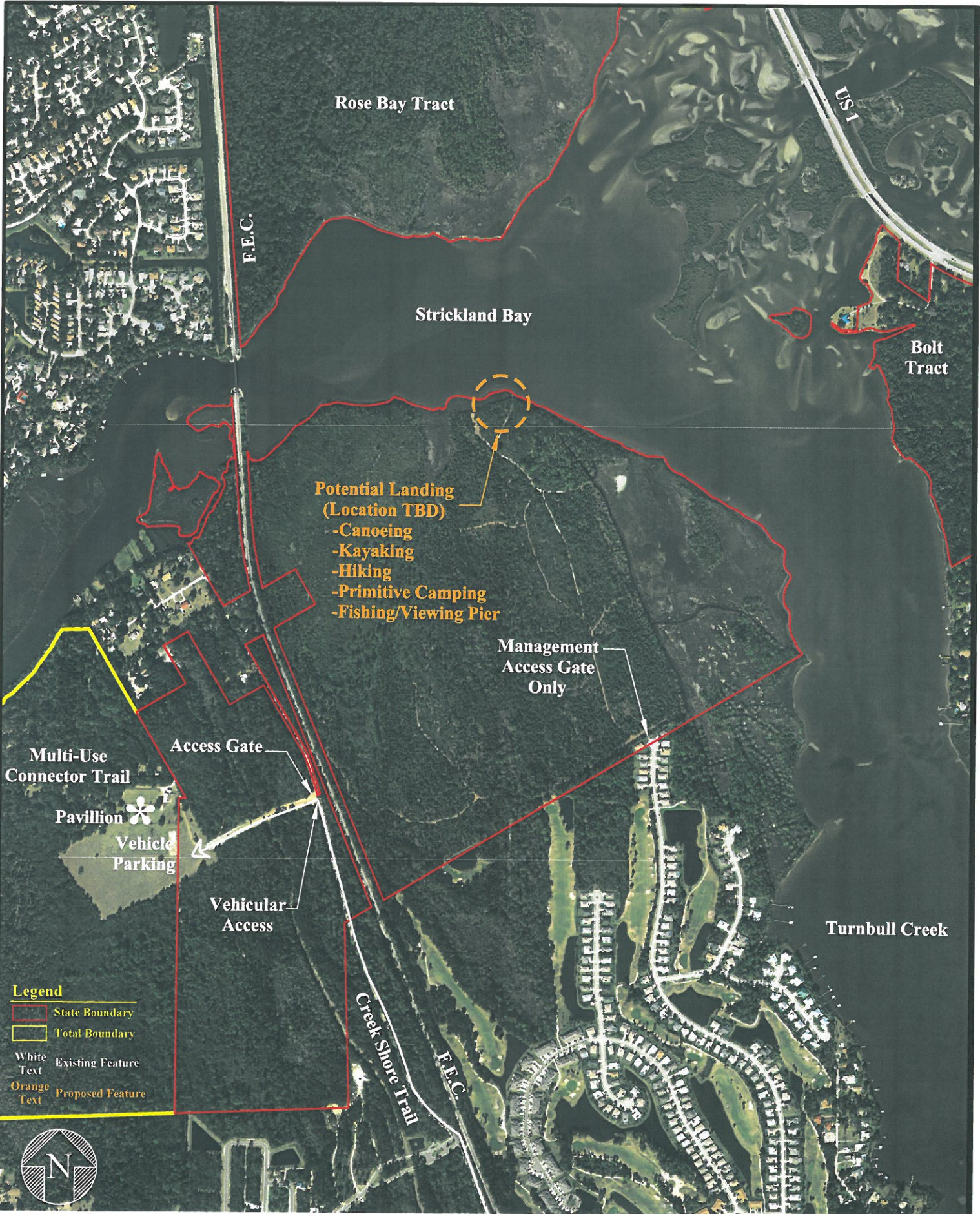
Parking: Gated: The most southwesterly portion of the site (west of the FEC) provides opportunity for vehicular and equestrian trailer parking

Habitats: salt marsh, mangrove swamp, bottomland forest, successional hardwood forest, improved pasture, mesic hammock, mesic flatwoods, scrubby flatwoods and scrub

Potential impacts / mitigative measures:

- Erosion on shoreline / develop canoe landing
- Resource impacts / limited access, develop primitive campsite that includes waste containers and signage, require permits
- Illegal dumping & ORV use / limited access
- Illegal activities – gated access and monitoring by staff

Comments: Tract is split by FEC railroad, East has no access. Water access to east tract is planned for long term implementation. West is contiguous with non-state owned lands and is used for parking, equestrian use and hiking.



Rose Bay Tract

US 1

Strickland Bay

Bolt Tract

Potential Landing
(Location TBD)
-Canoeing
-Kayaking
-Hiking
-Primitive Camping
-Fishing/Viewing Pier

Management
Access Gate
Only

Multi-Use
Connector Trail

Access Gate

Pavillion
Vehicle
Parking

Vehicular
Access

Turnbull Creek

Creek Shore Trail

Legend

- State Boundary
- Total Boundary
- White Text Existing Feature
- Orange Text Proposed Feature



0 1,000
SCALE : 1" = 1,000'

Turnbull Tract

Tract Name: Bolt Property:

Description: The Bolt tract is a 230 acre tract adjacent to US 1, Turnbull Bay and Murray Creek. The northern portion of the site, on the south side of US 1 is heavily used. A single family residence is located in this location as well, adjacent to the west side of this recreation area, adjacent to the water. The site contains an impoundment which has converted naturally to a salt marsh system, and has enough deep sections to allow access by canoe/ kayak.

Acreage: 230

Location: South and east of Turnbull Bay, primarily west of US 1, split by Murray Creek.

Access: Vehicular: via US 1

Current Hours of Operation: via the north end gate – open 8 AM closes 4:30 PM.

Existing Recreational Uses: Picnic, parking, fishing, canoeing

Planned Additional Recreational Uses: None beyond existing

Parking: Available at north end, access from US 1

Habitats: salt marsh (includes impoundment), mangrove swamp, coastal hydric hammock, maritime hammock, mesic flatwoods, scrub and developed

Potential impacts / mitigative measures:

- Erosion on shoreline / hardened shore exists
- Resource impacts / limited access
- Illegal dumping & ORV use / limited access
- Illegal activities – gated access and monitoring by staff

Comments: Residentially developed portion on the north end and an important water access.

Tract Name: Sleepy Hollow:

Description: This tract is about 20 acres of maritime hammock fronting US 1 and ICW tributaries. The site includes a paved strip of old US 1, parking and a pavilion.

Acreage: +/- 20

Location: South of Spruce Creek, East of US 1

Access: Gated, vehicular via US 1,

Current Hours of Operation: 8 AM to 4:30 PM (Gated)

Existing Recreational Uses: Fishing, covered pavilion for picnicking, parking

Planned Additional Recreational Uses: Water access launch, trail

Parking: Yes

Habitats: Maritime hammock, mangrove swamp

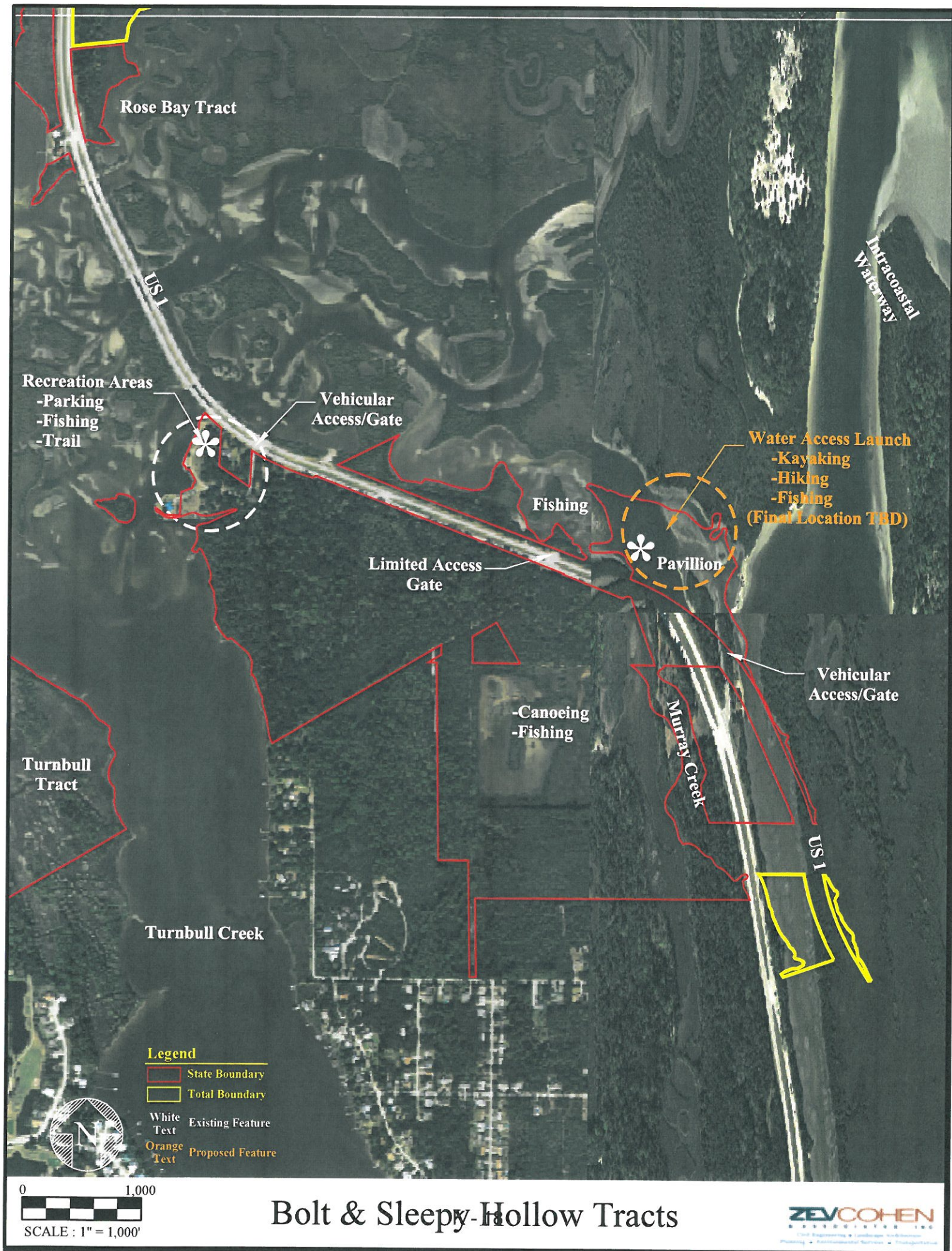
Potential impacts / mitigative measures:

Erosion on shoreline / develop launch or landing facility

Resource impacts / control access via trail management and signage

Illegal activities – gated access and monitoring by staff

Comments: Contains portion of old US 1, paved entrance, grass parking. This will be a prime location for a water access/ canoe launch as it is easily accessible to the public.



Tract Name: Rose Bay:

Description: The Rose Bay tract is a 642 acres tract adjacent to Rose Bay (to the north) and Strickland Bay (to the south). The portion east of the salt marsh has approved trails and multiple uses. This site is well supported by the adjacent Spruce Creek Park.

Acreage: 642

Location: South of Rose Bay, North of Strickland Bay

Access: Vehicular from US 1 via adjacent Spruce Creek Park.

Current Hours of Operation: 7:00 AM and closes at sunset.

Existing Recreational Uses: Canoeing/kayaking (launch is provided from Spruce Creek Park), fishing, boardwalks, lookout observation tower, pavilion and multi-use trails.

Planned Additional Recreational Uses: Provide final approved trail in western forested area.

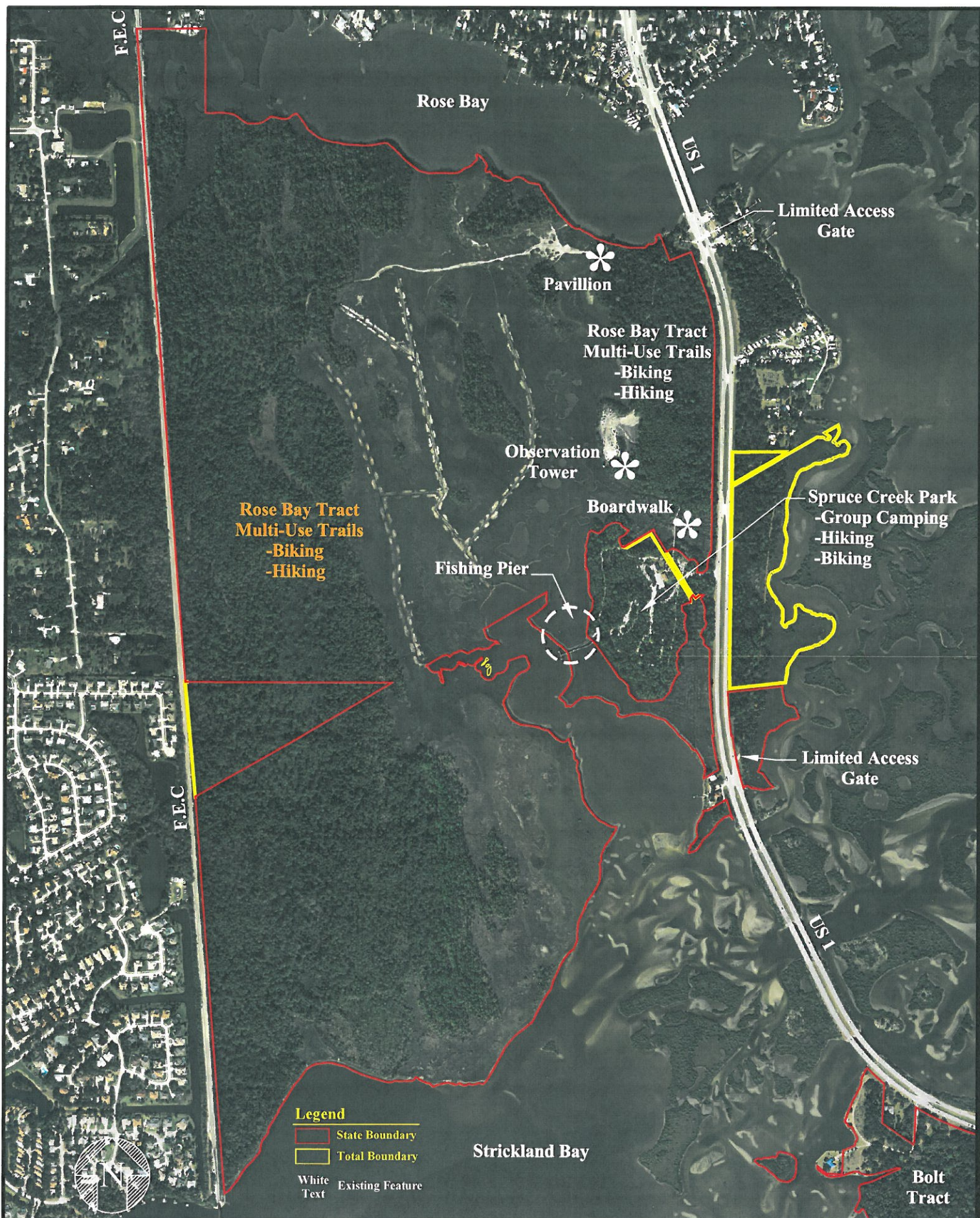
Parking: Offsite at Spruce Creek Park

Habitats: Salt marsh, mangrove swamp, wet prairie, wet flatwoods, mesic flatwoods, scrubby flatwoods, mesic hammock, clearing (proposed wetland restoration area).

Potential impacts / mitigative measures:

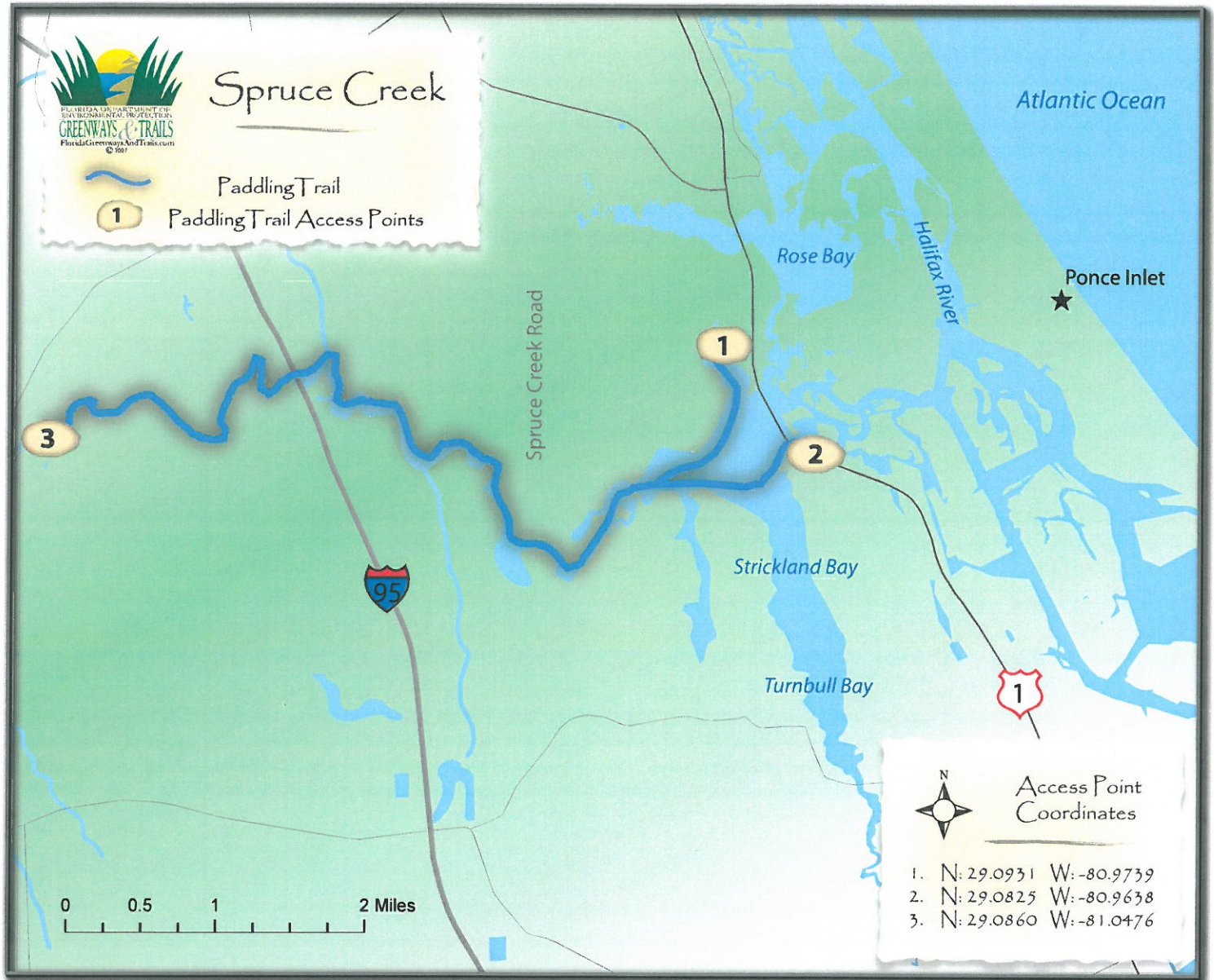
- Erosion on shoreline from canoe launch or landing / a specific access point is provided on Spruce Creek Park
- Resource impacts / establish final trail locations and signage
- Illegal dumping activities – gated access and monitoring by staff

Comments: Flatwoods west of salt marsh has infrequent visitors/use. A management access field road crosses the salt marsh into the western flatwoods. This is occasionally utilized by hikers, but is not a currently approved trail.



Rose Bay Tract

Spruce Creek Paddling Trail



Spruce Creek Trip Planning

County: Volusia

Nearest towns: New Smyrna Beach, Daytona Beach

Trip length: 16 miles round trip

Difficulty: Easy

Skill level: Beginner

****The provided mileage data is approximate (rounded to the nearest 0.5 mi) and shouldn't be relied upon for navigation.**

(Access Point 1) Put-in: Launch from Spruce Creek Park only at high tide. Because of deep mud, the ramp is unusable at low tide. Strickland Bay Bridge or Spruce Creek Outfitters can be accessed at any tide. The trip is the same distance, regardless of access choice.

Nearest town to put-in: New Smyrna **Miles from put-in:** 5

Directions to put-in at Spruce Creek Park: Take Dunlawton Avenue (SR421) east from I-95 interchange. Turn south on Nova Road (Hwy 5A) then south on US 1 for about one mile to Spruce Creek Park

(Access Point 2) Directions to put-in at Strickland Bay bridge: From the intersection of SR 44 and US 1 in New Smyrna travel north on US 1 4.8 miles. Look for a small, sandy beach on the east side of US 1, at the south end of the bridge.

(Access Point 3) Turn around point of round-trip

Take-out: Same as Access Points 1 and 2

Directions to take-out: Same as Access Points 1 and 2

Topo maps (USGS quads): Samsula, New Smyrna Beach

Gazeteer page: 75

Outfitters within 5 miles of trail:

Spruce Creek Outfitters
6296 U.S. Hwy. 1
Port Orange, FL 32127
(386)-763-9417

Shuttle service offered: No

USGS link (water level info):

http://waterdata.usgs.gov/fl/nwis/uv/?site_no=02248053&PARAMeter_cd=00065,00060

Tide info:

<http://tbone.biol.sc.edu/tide/tideshow.cgi?site=Ponce+de+Leon+Inlet+%28inside%29%2C+Florida>

Break / Lunch areas: None

Camping options: Spruce Creek Park has campsites but there is no camping along the river

Other lodging: There are numerous hotels in the Daytona Beach/New Smyrna area

Food/Beverage restrictions: None

What to expect on the river:

Tidal influence: Yes, check tide conditions prior to picking launch site

Pull-overs: None

Low branches: None

Narrow water: None

Shallow water: Numerous oyster bars at low tide near Strickland Bay

Strong currents: Possible with tides

Rocks: None

Houses: Numerous

Shoals: Oyster bars

Tight turns: None

Open water: Strickland Bay crossing to Spruce Creek

Springs: None

Potable water sources: Spruce Creek Park and Spruce Creek Outfitters

Wildlife: Numerous birds

Natural communities: Floodplain swamp, hydric hammock, freshwater marsh, salt marsh, mangroves

Portages: None

Swimming: At your own risk

Motorboats: May be heavy on weekends and holidays

Expect at parking Spruce Creek Park:

- **Parking fee:** No
- **Bathrooms:** Yes
- **Hours of operation** (gates close): Sunrise to Sunset
- **Camping:** Yes , visit: <http://echotourism.com/parks/camp.htm>
- **Camping fees:** Yes, contact (386)-322-5133
- **Crowds:** Varies with holidays, weekends
- **Boat Ramp:** No
- **Potable water source:** Yes
- **Canoe/kayak launch:** Yes

Expect at parking Strickland Bay Bridge

- Unimproved sandy boat launch in parking area at east side of the bridge, no amenities

Cultural and historical features along the trail:

Historically, a large indigenous Native American habitation was nestled around the Spruce Creek basin. A large prehistoric earthen works, the Spruce Creek Mound, is located on the creek. The site functioned as

a major ceremonial and political center for the Timucua Indians. Lesser mounds are scattered throughout surrounding areas.

Notes:

From the sandy beach launch area at the Strickland Bay Bridge on US 1, go under the bridge and paddle west through Strickland Bay towards a railroad bridge at the entrance of Spruce Creek. Nestled under tall pines just northwest of the US 1 Bridge, Spruce Creek Park has rest rooms, picnic tables, nature trails and a camping area. There is a canoe launch next to the park's fishing pier, however boats must be dragged quite a distance and it is unusable at low tide (too much mud). It is much easier to launch from the sandy beach off of US 1.

There are many oyster bars exposed at low tide in the bay between Strickland Bridge and the railroad bridge that marks the entrance of Spruce Creek.

APPENDIX L:

Land Management Review and Manager's Response

**Land Management Review of
Doris Leeper Spruce Creek Preserve
Lease No. 4195
February 20, 2007**

Prepared by Division of State Lands Staff

*Keith Singleton, Land Acquisition & Management Planner
Cindy Morris, Administrative Assistant*

For

Doris Leeper Spruce Creek Preserve Review Team

FINAL

June 19, 2007

Land Manager:	Volusia County
Area:	1903.49
County:	Volusia
Mgmt. Plan Revised:	2/13/2001
Mgmt. Plan Due:	2/13/2011

Management Review Team Members

Agency Represented	Team member Appointed	Team member In attendance
DOF	Bill Korn	Bill Korn
DEP District	Jennifer Cotch	Jennifer Cotch
FWCC	Mike Orlando	Mike Orlando
Private Land Manager	Alan Alshouse	Alan Alshouse
Conservative Org. (NPS)	Ray Jarrett	Ray Jarrett
SWCD	Michele Moen	Michele Moen
County	Dot Moore	Dot Moore
Observer (FNAI)	Carolyn Kindell	
Observer (DHR)	Mike Wisenbaker	
Observer (FDEP)	Greg Jubinsky	
Volusia County	Julie Scofield	
Volusia County (LAM)	Mark Rizzo	
Volusia County (LAM)	Randall Sleister	
Volusia County	Tim Baylic	

Process for Implementing Regional Management Review Teams

Legislative Intent and Guidance:

Chapter 259.036, F. S. was enacted in 1997 to determine whether conservation, preservation, and recreation lands owned by the state Board of Trustees of the Internal Improvement Trust Fund (Board) are being managed properly. It directs the Department of Environmental Protection (DEP) to establish land management review teams to evaluate the extent to which the existing management plan provides sufficient protection to threatened or endangered species, unique or important natural or physical features, geological or hydrological functions, and archaeological features. The teams also evaluate the extent to which the land is being managed for the purposes for which it was acquired and the degree to which actual management practices, including public access, are in compliance with the adopted management plan. If a land management plan has not been adopted, the review shall consider the extent to which the land is being managed for the purposes for which it was acquired and the degree to which actual management practices are in compliance with the management policy statement and management prospectus for that property. If the land management review team determines that reviewed lands are not being managed for the purposes for which they were acquired or in compliance with the adopted land management plan, management policy statement, or management prospectus, DEP shall provide the review findings to the Board, and the

managing agency must report to the Board its reasons for managing the lands as it has. A report of the review team findings is given to the managing agency under review, the Acquisition and Restoration Council, and the Governor and Cabinet and made available by site on the web at www.dep.state.fl.us/lands/landmgt/maps/default.htm .

Review Site

The management review team for Doris Leeper Spruce Creek Preserve considered approximately 1903.49 acres in Volusia County that are managed by Volusia County. The team evaluated the extent to which current management actions are sufficient, whether the land is being managed for the purpose for which it was acquired, and whether actual management practices, including public access, are in compliance with the management plan. The management plan update is due on February 13, 2011.

Review Team Determination

Is the land being managed for the purpose for which it was acquired?

After completing the checklist, team members were asked to answer “yes” or “no” to this question. Six team members agreed and one disagreed Doris Leeper Spruce Creek Preserve is being managed for the purpose for which it was acquired.

Are actual management practices, including public access, in compliance with the management plan?

After completing the checklist, team members were asked to answer “yes” or “no” to this question. Five team members agreed Doris Leeper Spruce Creek Preserve is not in compliance with the management plan. Two team members agreed Doris Leeper Spruce Creek is in compliance with the management plan.

Commendations to the Managing Agency

- 1. The team commends the County for their invasive exotic plant inventory, mapping, and treatment efforts at the Spruce Creek Preserve that has achieved maintenance condition. (VOTE 5+, 0-)**
- 2. The team commends the County for their continued proactive acquisition of outparcels, inholdings and adjacent lands to the preserve. (VOTE: 5+, 0-)**
- 3. The team commends the County and local school board for the extensive educational outreach programs at the preserve. (VOTE 5+, 0-)**

4. The team recognizes that the cultural resources at this site are of national significance. The team commends the County for its ongoing inventory and protective efforts for the highly significant cultural resources at the preserve. (VOTE 5+, 0-)

Exceptional Management Actions

The following items received high scores on the review team checklist (see attachments), which indicates that management actions exceeded expectations.

Exceptional management actions:

- Management of the mesic hammock, tidal marsh/mangrove, floodplain forest, upland mixed forest and mangrove communities.
- Control of invasive animals and plants.
- Maintenance of roads and culverts, ditches, hydro-period alteration and water-level alteration.
- Monitoring of the surface water and boundary survey and equipment.

Recommendations and Checklist Findings

The management plan must include responses to the recommendations and checklist items that are identified below.

Recommendations

The following recommendations resulted from a discussion and vote of review team members.

1. The team recommends that the County establish systematic annual monitoring of all known archaeological sites on the property, including photographic documentation and GIS mapping. (VOTE: 5+, 0-)

Manager's Response: There are 33 known archaeological sites (all documented in the Florida Master Site Files) located within the boundaries of the preserve. Those sites with more frequent visitor access are frequently monitored for natural and man-made impacts. (To protect these resources, it is our policy not to provide the general public with information regarding location of these sites, with the exception of the Spruce Creek Mound Complex, where an interpretive kiosk is planned.) The more remote sites are routinely monitored and documented.

The management review team specifically commended the County for its stewardship of the significant cultural resources found on the Preserve.

2. The team recommends that the County treat protection of environmentally sensitive and archaeological sites as the main priority in determining public recreational use of the property. (VOTE: 5+, 0-)

Manager's Response: Situated amid an urban/suburban area experiencing significant growth pressures, there presently exists a significant demand for access and use by the public to the Preserve. As the adjacent region continues to grow, it is anticipated that the demand by the public for access to the Preserve will dramatically increase.

Addressing this demand in a responsible manner that ensures proper stewardship of the Preserves' environmental and archaeological resources will be a continuing challenge.

The protection and preservation of the sensitive environmental and cultural resources (archaeological sites) of the Preserve will remain the fundamental goal guiding management of the Preserve. The Preserve is regularly monitored to identify adverse impacts associated with public use, and where necessary, formulate and implement mitigating or corrective measures.

*For example, particular effort has been focused on the Spruce Creek Mound Complex (8VO099) which is listed on the National Register of Historic Places. **Prior** to Volusia County's management, the Spruce Creek Mound Complex was seriously impacted. Early 20th century archaeologists actually excavated here, preceded and followed by pot hunters through the years. In modern times, **prior** to public ownership/management, it was used "unofficially" as a bike "ramp." Under Volusia County management this site has been successfully secured with fencing and alternative trail routes that do not impact cultural resources have been provided. There has been no discernable impact to this site since the fencing was installed, and this site is regularly monitored. A plan is in place to stabilize the site by introducing sterile fill on top of a barrier cloth, and remove damaged trees. This plan has been discussed in the field with Bureau of Archaeological Research (BAR) staff who concur with this strategy.*

There are 33 known archaeological sites located within the boundaries of the preserve. The vast majority of these sites were documented in the Florida Master Site Files as new sites by registered public archaeologists retained by local governments with field investigations and reports completed in 1986, 1989, 1990, 1996, 1997, 1999 and 2006. These studies have systematically addressed areas of most probable resources. For management purposes, the entire preserve is considered to be archaeologically sensitive and investigation is undertaken prior to any site disturbance or recreational uses with potential for ground disturbance, including frequent pedestrian traffic. Our general policy is not to provide the location of these sites to the public. This is a legitimate and effective tool to protect the sites in the more remote areas of the preserve from looting. We have also permitted the surrounding vegetation to camouflage these sites, making it more difficult for potential looters to locate the sites.

The Volusia County Historic Preservation Officer is a member of the management team, best management practices are applied, and we are in regular communication with staff at the Bureau of Archaeological Research (BAR), Division of Historical Resources (DHR) and Florida Public Archaeology Network (FPAN).

It is our intent to continue to provide the public with appropriate opportunities to use and enjoy the Preserve. However, these activities are to be offered in a way that is compatible with and furthers the over-arching strategy of providing proper protection of the Preserves' significant and sensitive environmental and archaeological resources.

3. The team recommends that the County develop a timber management assessment of the property. (VOTE: 5+, 0-)

Manager's Response: Although most of the acreage associated with Doris Leeper Spruce Preserve is not appropriate for timber harvesting, a timber management assessment for the remaining acreage will be developed and included as an appendix to the Management Plan Update.

4. The team recommends that the County establish an on-site county law enforcement presence on the Martin Dairy portion of the Preserve to improve protection of the site from illegal encroachments and vandalism. (VOTE: 5+, 0-)

Manager's Response: Volusia County Leisure Services maintains a residential caretaker lease agreement with a Volusia County Sheriff's Deputy. The duties of this individual, who resides within the Preserve, include patrolling Preserve grounds and to act a deterrent to vandalism. The County has expended approximately \$50,000 to maintain the residence and surrounding grounds as part of this commitment to protecting the resources and users of the Preserve.

5. The team recommends that the County establish a county-appointed advisory group for this tract, made up of community and professional members, to provide advice and support for management decisions. (VOTE: 5+, 0-)

Manager's Response: Volusia Forever Advisory Board was created in 2001 to provide guidance for the acquisition and management of conservation lands county-wide. In order to provide the expertise of historic and cultural aspects to the site, the Historic Preservation Board will provide input to the Volusia Forever Advisory Board.

6. The management responsibilities for this site are divided across several County Divisions. The team recommends that the County evaluate the management responsibilities across Divisions to consolidate organizational functions and to ensure accountability for program accomplishments. (VOTE: 5+, 0-)

Manager's Response: The Department of Growth and Resource Management is the department with the oversight for Doris Leeper Spruce Creek Preserve. Within the Department, Leisure Services as well as Land Acquisition and Management provides staff to implement the management plan.

7. The team recommends that the County develop a scrub jay monitoring and habitat restoration plan for the Preserve. (VOTE: 5+, 0-)

Manager's Response: Scrub jay monitoring has occurred in the area of Martin's Dairy Road. in 2003 and 2005. At that time it was estimated that two families existed in the area. In 2005, 4 birds were banded. Monitoring, using staff or qualified consultants, will continue on the property as long suitable habitat conditions are present. A habitat restoration plan will be developed and incorporated into the timber assessment plan.

8. The team recommends that the County include in the next plan update a revised natural communities map, using FNAI categories, and natural community descriptions including desired future conditions. (VOTE: 5+, 0-)

Manager's Response: The next update will have vegetative communities and desired future conditions mapped in accordance with FNAI guidelines.

9. The team finds the lack of any prescribed fire since acquisition of this property to be less than acceptable, given concerns for ecological values and mitigation of hazard to adjacent developments. The team recommends that the County develop a comprehensive prescribed fire plan for this site and make implementation to restore and manage the pyrogenic natural communities a top priority at this site. (VOTE: 5+, 0-)

Manager's Response: A prescribed fire plan is in its early draft stages and will be implemented subsequent to final approval. Due to smoke sensitive areas, such as Interstate 95, US Hwy 1, New Smyrna Beach Airport and surrounding residential communities, the plan will address challenges such as the substantial difficulty in sustaining a sufficient fire frequency to maintain healthy ecosystems and the protection of archaeological resources, and possible solutions such as mechanical alternatives to prescribed fire. The prescribed fire plan will be incorporated in the update of the management plan.

Checklist findings

The following items received low scores on the review team checklist (see Attachment 1), which indicates that management actions, in the field, were insufficient (f) or that the issue was not sufficiently addressed in the management plan (p). These items need to be further addressed in the management plan update.

1. Discussion in the management plan to address the management issues related to the sandhill, scrub, scrubby flatwoods and shell mound communities. (f)

Manager's Response: The mosaic of natural communities within the Preserve is comprised of a wide variety of habitats, including several that are rare. These communities are of varying quality and stages of maturity/succession.

Several of the communities also present challenging management opportunities, especially given the location of the Preserve. For example, several communities are dependent upon a comparably frequent fire interval. As noted in response to Item #4 below, the use of prescribed fire within the Preserve is fraught with practical difficulties.

We are aware of these concerns and will strive to continually seek creative and alternative means to properly manage the natural communities to ensure long-term viability/health.

Specific management strategies for the above identified, and other natural communities, of the Preserve will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan.

2. Discussion in the management plan of the listed species including the bald eagle (p,f), scrub jay, gopher tortoise and plant inventory (f).

Manager's Response: The diversity of the Preserve provides habitats that may accommodate numerous wildlife and plant species. The management plan presently identifies over one hundred listed species (plant and animal) observed and potentially occurring on the Preserve. This inventory, which includes the species itemized above, and the accompanying Florida Natural Areas data clearly point to the richness and value of the Preserve.

The set of resource management strategies of the existing management plan includes a general discussion of activities addressing listed species, such as surveying and other strategies.

Specific management strategies and future activities for the above identified and other listed species on the Preserve will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan.

3. Discussion in the management plan of the protection and preservation of the cultural resources. (f)

Manager's Response: As noted in the Manager's Response to Recommendation #1, numerous archaeological sites have been documented across the Preserve. This richness represents a core value of the Preserve. A high priority is placed upon the identification and protection of these resources. The Volusia County Historic Preservation Officer is a member of the management team. Best Management Practices are applied as a matter of routine management and we are in regular communication with staff at the BAR, DHR and FPAN.

The vast majority of the sites identified on the Preserve were documented in the Florida Master Site Files as new sites by registered public archaeologists retained by local governments with field investigations and reports completed in 1986, 1989, 1990, 1996, 1997, 1999 and 2006. These studies have systematically addressed areas of most probable resources. For management purposes, the entire preserve is considered to be archaeologically sensitive and investigation is undertaken prior to any site disturbance or recreational uses with potential for ground disturbance, including frequent pedestrian traffic. Our general policy is not to provide the location of these sites to the public. This is a legitimate and effective tool to protect the sites in the more remote areas of the preserve from looting. We have also permitted the surrounding vegetation to camouflage these sites, making it more difficult for potential looters to locate the sites.

Particular effort has been focused on the Spruce Creek Mound Complex (8Vo099) which is listed on the National Register of Historic Places. **Prior** to Volusia County's management, the Spruce Creek Mound Complex was seriously impacted. Early 20th century archaeologists actually excavated here, preceded and followed by pot hunters through the years. In modern times, **prior** to public ownership/management, it was used "unofficially" as a bike "ramp." Under Volusia County management this site has been successfully secured with fencing and alternative trail routes that do not impact cultural resources have been provided. There has been no discernable impact to this site since the fencing was installed, and this site is regularly monitored. A plan is in place to stabilize the site by introducing sterile fill on top of a barrier cloth, and remove damaged trees. This plan has been discussed in the field with BAR staff who concur with this strategy.

The management review team specifically commended the County for its stewardship of these significant resources.

Additionally, it our policy not to provide the general public with information regarding location of these sites, with the exception of the Spruce Creek Mound Complex, where an interpretive kiosk is planned.

Specific management strategies and future activities related to the management and protection of archaeological resources will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan. The protection and preservation of cultural resources will remain a high priority of emphasis in the update of the management plan.

4. Discussion in the management plan of the area, frequency and quality the desired of prescribed fire. (f)

Manager's Response: As noted in the response to Item #1 above, several communities found in the Preserve are dependent upon a comparably frequent fire interval. However, it is unlikely that the frequency of fire required for sustaining these communities can be met.

The use of prescribed fire within the Preserve, whether for purposes of community health or fuel reduction, is fraught with practical difficulties.

The Preserve is situated amid an urban/suburban area that is experiencing significant growth pressures. While pockets of residential use have existed for years adjacent to the Preserve, residential development at the periphery of the Preserve has significantly increased in recent years in response to the heightened demand associated with the regions population growth. This activity has generally occurred since development of the management plan.

Aside from adjacent residential land use, the Preserve is also bounded or traversed by the regional thoroughfares of Interstate 95 and U.S. 1. The Preserve is also traversed by a primary railroad line. Also, the New Smyrna Beach airport is located a short distance from the Preserve.

In addition to being adjacent to the aforementioned "smoke-sensitive areas", the wind pattern of this region also complicates the use of prescribed fire. The prevailing wind pattern in this portion of the county is an easterly/westerly direction. However, the narrow smoke corridor that may be acceptable for prescribed burning is oriented in a north to south direction.

Regardless of these concerns, it is noted that the County, like public agency land managers across the state, has experienced conditions that have been significantly hindered our efforts to undertake a consistent program of prescribed burning.

The use of prescribed fire will be further evaluated, including the possibility of alternatives, and comprehensively addressed as part of the forthcoming update of the management plan. As noted in the response to Recommendation #9 above, a prescribed fire plan is in the early stages of preparation. This plan will be incorporated in the forthcoming update of the management plan for the Preserve.

5. Discussion in the management plan of the efforts to restore the pastures, Australian pine, and the mosquito ditch.(p,f)

Manager's Response: The control of exotics and invasive species is a central activity in the overall management of the Preserve. The management review team specifically commended the County for exotic plant inventory, mapping and treatment efforts.

The only known stand of Australian pine has been removed. As part of the overall effort to control invasive and exotic species, this site is routinely monitored for re-generation and, if necessary, is re-treated. If new growth of this species is found, here or elsewhere, it will be treated.

A small area of pasture that was established as part of a now abandoned adjacent agricultural enterprise found in the western portion of the Preserve next to Martins Dairy Road, is gradually reverting to a natural condition. Pioneering species are becoming established on the site. Another area of pasture is found in the middle portion of the Preserve.

The overall restoration effort within the Preserve includes identification and evaluation of the existing mosquito control system. It is presently anticipated that restoration of the aforementioned ditch will begin in the next few months after final permitting.

The current management plan generally addresses the stewardship activities of exotic control and restoration. The management plan provides that highly disturbed areas will serve as access points and locations for facilities in order to minimize potential impacts associated with public use of the Preserve. These resource management efforts (restoration and potential sites for use by the public) should be evaluated and approached in a comprehensive and balanced manner. These topics will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan.

6. Discussion in the management plan of the non-native invasive and problem species. (p)

Manager's Response: The management review team specifically commended the County for exotic plant inventory, mapping and treatment efforts.

The set of resource management strategies of the existing management plan includes a section generally discussing the control of exotic plants. Since preparation of the management plan, specific activities have been conducted and/or coordinated to identify and control the presence of exotic and other problematic species. These on-going efforts have resulted in the control of Brazilian Pepper and other species.

Specific management strategies and future activities for the control of exotic and other problem species will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan.

7. Discussion in the management plan relating to the resource protection including the gates and fencing, signage and law enforcement presence. (f)

Manager's Response: The location of the Preserve amid an urban/suburban area, in combination with the configuration and length of the Preserve boundary (which includes extensive frontage upon navigable waterways and several roads/highways), represents a challenging environment in which to ensure proper resource protection.

We are consistently striving to properly address this issue. Concerns addressed on a routine basis include public access at inappropriate locales, transients and other unauthorized users, trash dumping, and vandalism. Steps undertaken to address this issue include the installation of gates and fencing. Maintenance of these items is also a common activity, as they are regularly subjected to destruction or damage by the public. As noted in the response to Recommendation #4 above, the County maintains a residential caretaker lease agreement with a Volusia County Sheriff's Deputy. The duties of this individual, who resides within the Preserve, include patrolling the Preserve and to act a deterrent to vandalism. In-house professional staff frequents the Preserve to ensure the protection of archaeological and historically sensitive areas.

Appropriate signage, including kiosks, has and will continue to be established at locales such as at recreational sites and other points of public access. Signage within the Preserve is intended to educate, guide, or inform the user. The signage, where appropriate, also addresses regulatory matters. An effort to develop a uniform sign design for the Preserve (e.g. to be used along major roads, at access points, etc) has been discussed.

The portions of the Preserve presently open for public use (e.g. the trails system on Martins Dairy Road) are extensively signed. As other locales are opened, the appropriate signage will be installed. An opportunity also exists to place appropriate signage along U.S. 1 to inform the travelling public as they enter/exit the Preserve.

Resource protection strategies, including access control and enforcement, will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan.

8. Discussion in the management plan of the adjacent property concerns including expanding development. (p,f)

Manager's Response: One of the attributes of the Preserve, and also one of the challenges presented to management, is its location. The Preserve is situated amid an urban/suburban area that is experiencing significant growth pressures. This population growth has heightened the demand for residential uses. As a result, residential development at the periphery of the Preserve has increased in recent years. Much of this activity has occurred since development of the management plan. This development and growth has, and will continue to, present a range of challenges related to stewardship of the Preserve. These issues include the ability to perform certain resource management activities and increased user demand/expectations.

Adding to this complexity is the configuration of the Preserve boundaries (increased edge) and that the lands adjoining the Preserve are within three different jurisdictions – County of Volusia (unincorporated) and the municipalities of Port Orange and New Smyrna Beach. Decisions regarding use(s) of lands adjoining the Preserve reside with the appropriate jurisdiction.

We are very much aware of these concerns and constantly strive to appropriately address the issues associated with this dynamic environment.

Most notably, the County, since 2000, has acquired title to four separate ownerships comprising approximately 218 acres of in-holdings and additions. The costs associated with these acquisitions collectively total approximately \$5.5 million, including the contributions of our agency partners. These acquisitions facilitate comprehensive management of the Preserve and have eliminated the potential for adverse impacts that may have otherwise be associated with development of the affected properties had each remained in private ownership. The management review team specifically commended the County on these efforts.

In addition to these completed acquisitions, the County has also recently obtained a signed contract from another property owner within the Preserve. The successful completion of this acquisition (seven acres with a purchase price of \$1.9 million dollars) will protect archaeological resources listed on the National Register of Historic Places.

We have also sought to protect the valuable resources encompassed by the Preserve from the potential impacts associated with development of adjacent properties by successfully amending the boundaries to encompass additional area. Subsequently, we have actively sought to acquire the properties within this expanded area. A potential partner this effort has been the Division of State Lands.

We also strive to regularly address concerns associated with adjacent land uses on a more routine level. For example, we have worked with a resident to assure that

public demand for access to the shoreline adjacent to his residence is provided in a balanced, responsible, manner.

The relationship between management of the Preserve and adjacent land uses (existing and future) will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan.

9. Discussion in the management plan of the public access and education including parking, canoe access (p), management of visitor impacts and environmental education/outreach (f).

Manager's Response: Situated amid an urban/suburban area experiencing significant growth pressures, there presently exists a significant demand for access and use by the public. As the adjacent region continues to grow, it is anticipated that the demand by the public for access to the Preserve will dramatically increase.

A variety of outdoor recreational opportunities, both water and land oriented, for use and enjoyment by the public exist and are planned (on both State and County-owned lands) within the Preserve. These opportunities include day use areas (i.e. picnic shelter, parking, playground, shoreline fishing, etc.), trails, and canoe access. The County has sought to further public availability by completing activities such as;

- upgrading roadways and providing entrances,*
- upgrading and establishing parking areas,*
- erecting picnic pavilions and wildlife observation platform, and*
- providing and correcting/upgrading trails.*

Collectively, these efforts have resulted in the expenditure of nearly \$400,000 since the year 2000. This expenditure does not include all personnel costs. In addition, approximately \$3,000 has been expended on special projects for site clean-up and debris removal.

The range of outdoor experience offered to the public includes educational activities. At present, the Preserve is being used by the Volusia School District as part of a county-wide educational program. The staff of County's Division of Land Acquisition and Management also includes a Naturalist who conducts educational programs at the Preserve.

Field classes are conducted by County's Historic Preservation Officer and Naturalist to educate members of the public about the archaeological (in particular the mound complex) and natural resources of the Preserve. The management review team specifically commended the County for its extensive outreach programs undertaken at the Preserve.

It is our intent to continue to provide the public with appropriate opportunities to use and enjoy the Preserve. These opportunities will be provided in a manner that is complimentary and compatible with the Preserves' other resources. As with all management efforts, these activities will also be tempered by factors such as the future availability of funding and other demands.

Public access and educational opportunities will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan.

10. Discussion in management plan of the infrastructure including the need for additional staff. (f)

Manager's Response: As outlined in the response to item #9 above, a mixture of public access and recreational uses are planned for the Preserve. Each of these uses necessitates the construction and maintenance of the appropriate facilities and supporting infrastructure. These improvements represent significant financial and personnel investments.

The Preserve is overseen by the collaborative efforts of staff from the Divisions of (a) Leisure Services and (b) Land Acquisition and Management of the County's Department of Growth and Resource Management. The Division of Land Acquisition and Management was formed subsequent to preparation of the existing management plan. The focus of this Division within the Preserve is generally upon natural resource matters. The Division of Leisure Services, the larger of the two Divisions, is generally directed toward public use and archaeological resources. Through this Division, the County maintains a presence seven days per week within the Preserve. This Division has one half-time staff member solely dedicated to performing operational and maintenance activities within the Preserve and two full-time staff members assigned to the County's Spruce Creek Park. Aside from working within the Park, these individuals also provide operational and maintenance support to other areas within Preserve. In-house professional staff frequents the Preserve to ensure the protection of archaeological and historically sensitive areas.

While every effort possible is made to assure proper stewardship of the Preserve, both of these Divisions operate / manage properties across the county. For example, the Division of Land Acquisition and Management, with a field staff of seven (7) individuals, presently manages over 28,000 acres of conservation lands county-wide, inclusive of the Preserve. The staff of the respective Divisions must constantly weigh the needs and demands of other properties with that of the Preserve and vice-versa. Aside from these challenges, the abilities and efforts of both Divisions are also tempered by budgetary considerations.

Staffing opportunities and constraints will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan.

11. Discussion in the management plan of the uses proposed in the management plan including the need for paved multi-use trails. (p)

Manager's Response: As discussed by the management plan, the conceptual mixture of recreational uses envisioned for the Preserve includes a brief statement regarding the possible provision of paved, multi-use, trails. These trails are proposed for establishment in the southeastern portion of the Preserve. The actual location and alignment is to be determined in the future after consultation with user groups.

Segments of paved trails are typically constructed by the County when the segment is part of a planned or existing system that extends for significant distances spanning broad portions of the county. These systems are conceptually depicted by the County's trails plan, a separate document. This document depicts the Old Kings Highway (which traverses a portion of the Preserve) as a "showcase multi-use trail corridor".

The opportunity(ies) for paved, multi-use, trails on the Preserve will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan.

Team Member's Comments

Natural Communities: protection and maintenance: (I.A)

- Neither the management plan, nor the managers could provide information on the acreages for any of the natural communities. Neither has the plan used the accepted Florida Natural Areas Inventory community descriptions, which makes assessment difficult. The flatwoods are in desperate need of fire, with heavy fuel build-up due to the lack of any prescribed fire since acquired by the county. Scrub conditions are well past burning and will require mechanical treatment. The sand pine appeared to be of merchantable size, so that logging may be an option. There is some considerable concern for public access and trail use adjacent to and over shell mound, one of which is on the national register. The shell mounds need to be provided a wider protection area where trail construction is prohibited. In summary regarding the scrub, an overall scrub and scrubby flatwoods restoration plan is strongly suggested. This plan should also address monitoring for scrub jays.
- Cumulative user abuse must be addressed and solved. Burns are needed for some communities. No information is provided on water quality and quantity. No acreage information is provided on different communities. Restoration of the scrub is needed. Maintenance is needed on a more regular basis.
- Some user impacts and potential. Need additional staff, resources or out sourcing to meet goals.
- Needs fire in the uplands and acreage identified. Users must not dictate your management.
- The fire dependent communities appear fire suppressed. The tidal marsh and mangrove communities are healthy, little or no invasive plant species. Some soil erosion on multi use trails in the mesic hammock near Martin Dairy Road and Spruce Creek Bluff.
- The erosion has been caused by user groups. There is a need for prescribed burning in the sand hill and scrub areas.

Listed Species: protection and preservation (I.B1, I.B.2)

- It is not clear what current population of scrub jays is. No monitoring is occurring and the habitat conditions are poor. More monitoring is needed for gopher

tortoises. The team observed on the upland site where vandals had dug up 3 or 4 burrows to hunt and destroy adult tortoises.

- Wildlife monitoring is needed. Very little knowledge of wildlife. Plant survey needs to be done. The plant communities are not managed.
- A second Bald Eagle nest is known to occur within the preserve in the southeast area just west of US1 along Murray Creek just south of Sleepy Hollow; nest #Vo088. A survey for threatened and endangered plants is needed. A survey for Rugel's pawpaw may be needed for Martin Dairy and Spruce Creek Bluff areas where the flatwoods occur.
- Prescribed burning is necessary for the scrub jay habitat revival.

Cultural Resources: (II.A; II.B)

- No interpretation of cultural sites is provided to visitors. No photo monitoring, as prescribed in the plan, has yet been initiated. There are over 30 cultural archeological sites listed with the Division of Historical Resources. The plan has called for a level 1 archeological survey. This has not been completed; however several measures are planned to improve protection of old village site.
- A more complete survey is needed. User abuse must be solved. An educational center and signage is needed.
- Photographic monitoring needs to be done and more education.
- Much more additional surveys are required around known sites and to identify unknown sites, particularly in high potential areas.

Prescribed Fire (Natural Community Maintenance): (III.A)

- A comprehensive fire management plan for this site has still not been completed. No prescribed fire has been done on this property since acquisition from the state. Much of this property is using restoration fire strategies.
- The burns are insufficient.
- Need to develop a comprehensive burn plan. The urban interface is a challenge for the burn program.
- Needs fire zones, mechanical and to protect longleaf sensitive areas.
- Most fire dependent communities are in need of prescribed burning.
- The 1998 wildfires cleared areas naturally.

Restoration of Disturbed Natural Communities: (III.B)

- The removal of Australian pine and planted native herbaceous plants.

Non-native Invasive and Problem Species: (III.D)

- The management plan needs to provide more specific information on non-native exotic plant populations and eradication measures. During the review, no major problems were observed. Evidence was seen of Australian pine and Brazilian

pepper populations. Exotics seem to be in maintenance condition. Florida Natural Areas Inventory is scheduled to conduct an invasive, non-native plant survey.

- There are no animal problems. The Brazilian pepper and Australian pine problem is being addressed. The St Augustine grass needs attention.
- Trapping feral hogs. Brazilian pepper, Air potatoes, lantana, Australian pine, have been treating.
- Other exotic invasives that were sighted are, Air potato (*Dioscorea Bulbifera*). The coyote, feral pigs are possible non-native animals on site.
- The feral pigs are being trapped and removed.

Hydrologic/Geologic Function (III.E)

- Has access to the data, but not supplied to the reviewers. Does not review available information.
- Have adequate monitoring program.

Resource Protection: (III.F)

- Fencing and gates are lacking in certain areas allowing motorized vehicles to easily access the Martin Dairy property and the Bolt Tract. The old survey and boundary marking needs to be better maintained.
- No boundary map is available. The signage is insufficient. Vandals are a problem and law enforcement is inadequate.
- Need to have a resident deputy and off duty deputies. Need to propose future residences.
- Don't dismiss the moving of the gate back to the parking lot on the 7th time.
- More law enforcement is needed to stop vandalism and ATV on and off road vehicle use.

Adjacent Property Concerns: (III.G)

- A new plan should address clustering to create larger buffers requirement for previous surfaces. Low impact development. Retention ponds – damage to preserve. Rain gardens, edge effect study needed. Requirement for native plants and keeping of native plants.
- Need to address edge effect of future development.

Public Access and Education: (IV.1; IV.2; IV.3; IV.4)

- Most of the recreational components in the plan have not been pursued as proposed in the 2000 plan. Public access (legal) is lacking on general parcels. More official signage is needed at the entrance points. It is not clear who owns the property and who the manager is. More efforts are needed to coordinate management responsibilities and priorities amongst, not only recreation user groups, but other archeological and conservation interests. Use of a 10-12

member, county appointed advisory group would be helpful in educating the public and develop understanding and support for management decisions.

- There is a classroom facility at the park but no general public educational facility as recommended in the plan.

Management Resources: (V.2. V.3; V.4)

- A staff person needs to be assigned to this tract for management decisions and supervision of the overall program to improve accountability for accomplishment of all program objectives.
- There are no bathrooms, could use composting toilets.
- Seriously understaffed. Need funding for more employees, wildlife monitoring, burns and an educational center.
- Equipment can be mobilized to the sites.
- Currently there are 7 staff county wide for land management; 3 for leisure service. Funds are available for outsourcing.
- Much more staff and funding is needed to manage fire prescriptions, property management and species survey, etc.

Managed Area Uses: (VI.A, VI.B)

- There is a real concern for allowing two intensive level of public access and recreation use.
- Erosion is a real concern with proposed canoe access sites along Spruce Creek Bluff areas. This can already be seen at one site on the property. Such a streamside improvement might also impact archeological sites.

Review Team Determination

Purpose for acquisition

- This is a preserve. Surrounding land use, both existing and planned has and will greatly lessen the value of this land as a preserve. Also, law enforcement is needed. User abuse is rampant.
- Overall yes, some improvements are needed.
- The management plan for the preserve looks to be a great initial proposal, but more staff may be needed for future management, including prescribed burning and threatened and endangered surveys.

Management plan compliance

- The property needs a new management plan that reflects current priorities and sensitivity to cultural and natural resource needs. No burning has been done other than bike and equestrian trails on one parcel, several of which threaten significant archeological sites. There has been minimal implementation of public use and interpretive facilities as proposed in the management plan. Most of the

fire dependent communities are far out of maintenance condition due to lack of fire. The problem continues to persist, which will now require more intensive restoration measures, possibly including mechanical treatments.

- Public access is fairly good. (Need signs) They need better education for the general public. Prescribed fire and mechanical community's treatments are needed. Signage and security needs improvement.
- Need more land management. (fire, users)
- On the way, but not all in.

Exceptional Management Actions

- The management plan does a fairly good job of identifying current species composition in most of the natural community types. Good job of cleaning up the old US 1 highway site from extensive dumping and abuse. Good work to monitor and remove invasive exotic plants.
- Staff is very concerned over historical sites and damage caused to the preserve by abusive users and vandals. They are doing the best they can considering they are under staffed.
- Exotic and invasive control and continued acquisition of out parcels and adjacent property.
- Exceptional management actions include exotics in control and education.

Areas of insufficient management

- For the natural communities, it is recommended that you contract with Florida Natural Areas Inventory, or others, to survey the property and prepare historical and current natural community maps with guidance on resource management needs. Areas for each community, especially pre-dependent habitats, need to be researched and documented. The management plan should describe the desired condition or maintenance condition for each major community type.
- No wildlife monitoring. (Gopher tortoise habitat vandalized) No knowledge of water quality. No interest in addressing the impacts from bordering urban. No plant survey done. Need more Staff!
- The area of insufficient management is User Abuse.

Recommendations for Improving Management of this Site:

- It seems appropriate for county staff to review the way staff is organized here. Three different divisions play different roles, but not with overall responsibility.
- Funding for more staff and an educational facility. There needs to be an edge effects study. Research low impact development for undeveloped lands in Port Orange and Samsula which crash into the preserve. Port Orange plan high density development of hundreds of acres which will crash into the preserve. The county should utilize its environment minimal standards ordinance to protect the preserve. Wildlife and water quality must be monitored as well as a survey of plant life.

- Develop management plans for listed species, animals and plants. Develop timber management plan. Develop advisory council for pres.
- There needs to be monofilament collection stations throughout preserve to collect fishing line.
- There needs to be more security presence.

PLAN REVIEW		1	2	3	4	5	6	7	AVERAGE
Natural Communities (I.A)									
Mesic Hammock	I.A.1	1	0	1	1	1	1	1	0.86
Tidal Marsh/Mangrove	I.A.2	1	0	1	1	1	1	1	0.86
Mesic/Wet Flatwoods	I.A.3	0	0	1	1	1	1	1	0.71
Sandhill	I.A.4	0	0	1	1	1	1	1	0.71
Xeric Hammock	I.A.5	1	0	1	1	1	1	1	0.86
Floodplain Forest	I.A.6	1	0	1	1	1	1	1	0.86
Upland Mixed Forest	I.A.7		0	1	1	1	1	1	0.83
Mangrove	I.A.8		0	1	1	1	1	1	0.83
Scrub	I.A.9	0	0	1	1	1	1	1	0.71
Scrubby Flatwoods	I.A.10	0	0	1	1	1	1	1	0.71
Shell Mound	I.A.11	0	0	1	1		1	1	0.67
Listed species: Protection & Preservation (I.B)									
Animal Inventory	I.B.1	0	0	1	1	1	1	1	0.71
Scrub Jay	I.B.1.a	0	0	1	1			1	0.60
Gopher Tortoise	I.B.1.b	0	0	1	1			1	0.60
Bald Eagle	I.B.1.c	0	0	1	1				0.50
Plant Inventory	I.B.2	1			1	0	1	1	0.80
Cultural Resources (Archeological & Historic sites) (II.A,II.B)									
Cultural Res. Survey	II.A		0	1	1	1	1	1	0.83
Protection and preservation	II.B	0	0	1	1	1	1	1	0.71
Resource Management, Prescribed Fire (III.A)									
Area Being Burned (no. acres)	III.A.1	0	0	1	1	1	1	1	0.71
Frequency	III.A.2	0	0	1	1	1	1	1	0.71
Quality	III.A.3	0	0	1	1	1	1	1	0.71
Restoration of Ruderal Areas (III.B)									
Pastures	III.B.1	0	0	0	0	1	1	0	0.29
Australian Pine (Removal to Tidal Marsh)	III.B.2	0		0	0	1		1	0.40
Mosquito Ditch	III.B.3	0	0	1	1		1	1	0.67
Non-Native, Invasive & Problem Species (III.D)									
Animals	III.D.1	0	0	0	1	1	0	1	0.43
Plants	III.D.2	0	0	1	1	1	0	1	0.57
Hydrologic/Geologic function Hydro-Alteration (III.E.1)									
Roads/culverts	III.E.1.a	1		0	1	1	1		0.80
Ditches	III.E.1.b	1		0	1	1			0.75
Hydro-period Alteration	III.E.1.c	1		0	1	1			0.75

Water Level Alteration	III.E.1.d	1		0	1	1			0.75
Surface Water Monitoring (III.E.3)									
Surface water quality	III.E.3.a	1	0	1	1	1	1	1	0.86
Surface water quantity	III.E.3.b	1	0	1	1	1	1		0.83
Resource Protection (III.F)									
Boundary survey	III.F.1	1	0	1	1	1	1	1	0.86
Gates & fencing	III.F.2	0	0	1	1	1		1	0.67
Signage	III.F.3	0	0	0	1	1	1	1	0.57
Law enforcement presence	III.F.4	0	0	1	0	1	1	1	0.57
Adjacent Property Concerns (III.G)									
Land Use									
Expanding development	III.G.1a	0	0	1	1	0		1	0.50
Inholdings/additions	III.G.2	1	0	1	1			0	0.60
Public Access & Education									
Public Access-Maintenance									
Roads	IV.1a	1	0	1	1	1	1	1	0.86
Parking	IV.1b	0	0	1	0	1	1		0.50
Canoe Access	IV.1c	0	0	1	0	1			0.40
Recreational Opportunities	IV.2		0	1	1	1	1	1	0.83
Management of Visitor Impacts	IV.3	0	0	1	1	1	1	1	0.71
Interpretive facilities and signs	IV.4	0	0	1	1	1	1	1	0.71
Environmental education/outreach	IV.5	1	0	1	1	1	1	1	0.86
Managed Area Uses									
Existing Uses									
Picnicking	VI.A.1	1	1	1	1	1	1	1	1.00
Nature trails	VI.A.2	1	1	1	1	0	1	1	0.86
Fishing	VI.A.3	1	1	1	1	1	1	1	1.00
Canoeing	VI.A.4	1	1	1	1	1	1	1	1.00
Off-road bicycling	VI.A.5	1	1	1	1	1	1	1	1.00
Horseback riding	VI.A.6	1	1	1	1	1	1	1	1.00
Uses Proposed in Mgmt. Plan									
Visitor center	VI.B.1	1	0	1	1	1	1	1	0.86
Paved multi-use trails	VI.B.2	0	0	1		1	1	0	0.50
Tent Camping	VI.B.3	1		1		1	0	1	0.80

FIELD REVIEW		1	2	3	4	5	6	7	AVERAGE
Natural Communities (I.A)									
Mesic Hammock	I.A.1	4	4	4	4	4	4	4	4.00
Tidal Marsh/Mangrove	I.A.2	x	3	4	5	5	5	5	4.50
Mesic/Wet Flatwoods	I.A.3	1	3	3	3	1	4	3	2.57
Sandhill	I.A.4	1	2	2	2	1	2	3	1.86
Xeric Hammock	I.A.5	3	3	2	2	4	4	4	3.14
Floodplain Forest	I.A.6	3	3	5	4	5	x	x	4.00
Upland Mixed Forest	I.A.7	x	4	5	4	5	4	5	4.50
Mangrove	I.A.8	x	3	4	5	5	5	4	4.33
Scrub	I.A.9	1	2	3	1	1	x	3	1.83
Scrubby Flatwoods	I.A.10	2	3	3	3	1	2	3	2.43
Shell Mound	I.A.11	2	2	x	2	1	1	x	1.60
Listed species: Protection & Preservation (I.B)									
Animal Inventory	I.B.1	2	1	3	3	2	1	2	2.00
Scrub Jay	I.B.1.a	1	1	3	1	x	2	1	1.50
Gopher Tortoise	I.B.1.b	1	1	3	1	x	2	2	1.67
Bald Eagle	I.B.1.c	2	1	4	1	x	x	x	2.00
Plant Inventory	I.B.2	2	1	4	3	1	4	2	2.43
Cultural Resources (Archeological & Historic sites) (II.A,II.B)									
Cultural Res. Survey	II.A	x	3	x	1	4	x	3	2.75
Protection and preservation	II.B	x	2	x	1	2	3	3	2.20
Resource Management, Prescribed Fire (III.A)									
Area Being Burned (no. acres)	III.A1	1	1	1	1	1	1	1	1.00
Frequency	III.A.2	1	1	1	1	1	1	1	1.00
Quality	III.A.3	1	1	1	1	1	1	1	1.00
Restoration of Ruderal Areas (III.B)									
Pastures	III.B.1	1	1	1	2	1	x	1	1.17
Australian Pine (Removal to Tidal Marsh)	III.B.2	3	2	4	3	3	2	2	2.71
Mosquito Ditch	III.B.3	2	1	1	1	1	x	1	1.17
Non-Native, Invasive & Problem Species (III.D)									
Animals	III.D.1	3	x	4	4	4	x	3	3.60
Plants	III.D.2	4	4	5	5	4	x	3	4.17
Hydrologic/Geologic function Hydro-Alteration (III.E.1)									
Roads/culverts	III.E.1.a	3	3	5	5	3	x	x	3.80
Ditches	III.E.1.b	3	3	5	5	3	x	x	3.80
Hydro-period Alteration	III.E.1.c	2	3	5	5	3	x	x	3.60
Water Level Alteration	III.E.1.d	3	3	5	5	3	x	x	3.80

Surface Water Monitoring (III.E.3)									
Surface water quality	III.E.3.a	3	x	5	5	2	x	3	3.60
Surface water quantity	III.E.3.b	3	x	5	5	2	x	x	3.75
Resource Protection (III.F)									
Boundary survey	III.F.1	3	2	5	4	4	x	4	3.67
Gates & fencing	III.F.2	2	2	3	2	3	x	2	2.33
Signage	III.F.3	2	2	1	3	3	x	2	2.17
Law enforcement presence	III.F.4	2	1	x	2	2	x	2	1.80
Adjacent Property Concerns (III.G)									
Land Use									
Expanding development	III.G.1a	2	1	3	2	2	x	3	2.17
Inholdings/additions	III.G.2	4	3	4	3	4	x	2	3.33
Public Access & Education									
Public Access-Maintenance									
Roads	IV.1a	3	3	4	4	3	3	2	3.14
Parking	IV.1b	2	3	3	3	2	3	2	2.57
Canoe Access	IV.1c	2	3	4	3	5	2	x	3.17
Recreational Opportunities	IV.2	x	3	4	4	3	3	3	3.33
Management of Visitor Impacts	IV.3	2	x	3	1	2	1	2	1.83
Interpretive facilities and signs	IV.4	2	2	3	3	1	2	2	2.14
Environmental education/outreach	IV.5	4	1	5	4	5	3	2	3.43
Management Resources									
Maintenance									
Waste disposal	V.1a	3	4	5	4	4	5	3	4.00
Sanitary facilities	V.1b	3	2	4	3	4	1	2	2.71
Infrastructure									
Buildings	V.2a	3	1	4	4	3	x	2	2.83
Equipment	V.2b	4	3	4	5	3	4	2	3.57
Staff	V.3	3	1	3	4	1	2	2	2.29
Funding	V.4	3	1	4	4	2	4	2	2.86

APPENDIX M:

Letters of Compliance with Local Government Comprehensive Plan



**Growth and Resource Management Department
Planning and Development Services**

September 2, 2011

Tim Baylie
Director of Parks, Recreation and Culture
202 North Florida Avenue,
DeLand, Florida 32720

Re: Comprehensive Plan Consistency Determination for the
Doris Leeper Spruce Creek Preserve Management Plan

The Volusia County Growth and Resource Management Department has reviewed the management plan for the Doris Leeper Spruce Creek Preserve for consistency with the Volusia County Comprehensive Plan. Our department finds the management plan is consistent and furthers the intent of the Volusia County Comprehensive Plan by increasing recreational opportunities for its residents, balanced with preserving and protecting natural resources.

Please contact Thomas Brooks, AICP, Planner II at 386-736-5959, Extension 12021, if you have any questions about this letter.

Sincerely,

FOR Kelli McGee,
Acting Director of Growth and Resource Management



CITY OF PORT ORANGE

1000 CITY CENTER CIRCLE

PORT ORANGE, FLORIDA 32129

September 26, 2011

Mr. Tim Baylie
Director of Parks, Recreation and Culture
202 North Florida Avenue
DeLand, FL 32720

**RE: Comprehensive Plan Consistency Determination
Doris Leeper Spruce Creek Preserve Management Plan**

Dear Mr. Baylie:

After reviewing the current management plan for the Doris Leeper Spruce Creek Preserve, Port Orange finds it consistent with our Comprehensive Plan. Management efforts within the Preserve fulfill many of the City's goals and objectives of providing recreational opportunities, preserving land, and limiting impacts to Spruce Creek and its water quality.

If you need further clarification or information, please contact me at 386-506-5501.

Sincerely,

Kent E. Donahue
Special Assistant to the City Manager

APPENDIX N:
Arthropod Control Plan



Florida Department of Agriculture and Consumer Services
Division of Agricultural Environmental Services

ARTHROPOD MANAGEMENT PLAN - PUBLIC LANDS

ADAM H. PUTNAM
COMMISSIONER

Section 388.4111, F.S.
Telephone: (850) 617-7997

For use in documenting an Arthropod Control Plan for lands designated by the State of Florida or any political subdivision thereof as being environmentally sensitive and biologically highly productive therein. Fill this form out if control work is necessary or planned.

Name of Designated Land:

Doris Leeper Spruce Creek Preserve

Is Control Work Necessary: ☒ Yes ☐ No

Location:

Multiple parcels located on or near Spruce Creek and associated tributaries.

Land Management Agency:

**County of Volusia
Department of Community Services
Division of Parks, Recreation and Culture**

Are Arthropod Surveillance Activities Necessary? ☒ Yes ☐ No

If "Yes", please explain:

Required as the primary component of an Integrated Mosquito Management (IMM) program.

Which Surveillance Techniques Are Proposed?
Please Check All That Apply:

☒ Landing Rate Counts

☒ Light Traps

☐ Sentinel Chickens

☒ Citizen Complaints

☒ Larval Dips

☒ Other

If "Other", please explain:

Portable "light trap" style trap baited with adult mosquito attractant i.e. carbon dioxide, octenol and/or BG Lure.

Arthropod Species for Which Control is Proposed:

Diptera: Culicidae

Aedes species including *Ae. albopictus*, *Ae. atlanticus*, *Ae. infirmatus*, *Ae. sollicitans* and *Ae. taeniorhynchus*.

Culex species including *Cx. nigripalpus* and *Cx. salinarius*.

Psorophora ferox

Proposed Larval Control:

Proposed larval monitoring procedure: **Dipping, utilizing standard dipper and methodology.**

Are post treatment counts being obtained: ☒ Yes ☐ No

Biological Control of Larvae:

Might predacious fish be stocked: ☒ Yes ☐ No

VCMC has a small fish hatchery which provides the district with *Gambusia affinis*, obtained from a variety of Volusia County locations. Only *G. affinis* would be utilized.

Other biological controls that might be used:

See below Biorational agents including *Bti* and *Bs*.

Material to be Used for Larvaciding Applications:

(Please Check All That Apply:)

☒ Bti

☒ Bs

☒ Methoprene

☒ Non-Petroleum Surface Film

☒ Other, please specify: **Spinosad**

Please specify the following for each larvacide:

Chemical or Common name: ***Bti* = VectoBac, *Bs* = VectoLex, *Bti/Bs* combination = VectoMax, methoprene = Altosid, spinosad = Natular**

☐ Ground ☐ Aerial

Rate of application:

VectoBac = 0.25-2pts/acre (liquid) or 2.5-20lbs/acre (granular), VectoLex = 5-20lbs/acre (granular), VectoMax = 5-20lbs/acre or 1 WSP (water soluble pouch = 10g)/50 sq ft.

Natular = 1.1-2.8fl oz/acre (liquid) or 3.5-9lbs/acre (granular) or 5-15lbs/acre (extended release granular).

Altosid = 0.75-1fl oz/acre (liquid) or 2.5-10lbs/acre (extended release pellets).

Method of application: **Hand, Backpack, Truck-mounted applicator and/or Helicopter.**

Proposed Adult Mosquito Control:

Aerial adulticiding ☒ Yes ☐ No

Ground adulticiding ☒ Yes ☐ No

Please specify the following for each adulticide:

Chemical or common name:

Etofenprox, Naled, Permethrin, Prallethrin, Resmethrin, Sumithrin

Rate of application:

Etofenprox = 0.00175-0.007lb AI/acre (0.9-3.6fl oz/min at 10 mph), Naled = 0.05-0.1lb AI/acre (0.5-1fl oz/acre).

Permethrin/PBO = 0.00175-0.007lb AI/acre (0.9-3.6fl oz/min at 10mph).

Prallethrin = 0.00024-0.00072lb AI/acre, PBO = 0.0012-0.0036lb AI/acre, Sumithrin = 0.0012-0.0036lb AI/acre (all at 0.41-1.23fl oz/acre).

Resmethrin = 0.0015-0.007lb AI/acre (0.77-3.59fl oz/min at 10 mph)

Method of application:

Ultra Low Volume (ULV); Hand-held ULV, ATV-mounted ULV unit, Truck-mounted ULV unit and/or Helicopter ULV

Proposed Modifications for Public Health Emergency Control: Arthropod control agency may request special exception to this plan during a threat to public or animal health declared by State Health Officer or Commissioner of Agriculture.

Proposed Notification Procedure for Control Activities:

ULV adulticiding will occur following surveillance and include required DACS criteria. Notification will occur 24 hours in advance of an adulticiding event and will include both a phone call and email to the Park Manager as well as any other previously identified Park Personnel.

Records:

Are records being kept in accordance with Chapter 388, F.S.:

☒ Yes ☐ No

Records Location: **VCMC, 801 South St, New Smyrna Beach, FL**

How long are records maintained: **5+ years**

Vegetation Modification: n/a

What trimming or altering of vegetation to conduct surveillance or treatment is proposed?

Proposed Land Modifications:

Is any land modification, i.e., rotary ditching, proposed: **If proposed in the future would consist of salt marsh dragline ditch restoration which may include limited amphibious rotary ditch utilization to reduce mosquito production habitat.**

Include proposed operational schedules for water fluctuations: **N/A**



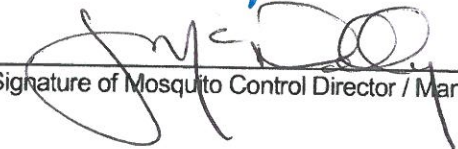
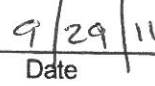
List any periodic restrictions, as applicable, for example peak fish spawning times. **N/A**

Proposed Modification of Aquatic Vegetation: **N/A**

Land Manager Comments:

The Land Manager supports this plan.

Arthropod Control Agency Comments:

	
Signature of Lands Manager or Representative	Date
	
Signature of Mosquito Control Director / Manager	Date